

ภาคผนวก ง

ใบรับรองผลการตรวจวัดคุณภาพสิ่งแวดล้อม

ใบรับรองผลการตรวจวัดคุณภาพอากาศในบรรยากาศ



Ambient Air Monitoring Results : Sulfur dioxide

MTR-SPRC PLC-Refinery

Location : With in Refinery Plant, North

Monitor Period : 24 Nov 2025-01 Dec 2025

Analyzer Model : API 100A

Station No : SS2-03

Serial No : 382

Site Operator : Mr. Phuwadech Kaewjirakulsri

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)						
	24-25 Nov 2025	25-26 Nov 2025	26-27 Nov 2025	27-28 Nov 2025	28-29 Nov 2025	29-30 Nov 2025	30-01 Dec 2025
12:00 - 13:00	1.7	3.1	4.5	2.2	2.9	3.3	4.2
13:00 - 14:00	1.9	1.6	2.4	4.8	2.7	4.4	4.2
14:00 - 15:00	1.8	1.9	4.2	3.6	1.8	2.2	3.9
15:00 - 16:00	4.1	4.9	3.0	2.2	3.2	1.8	2.3
16:00 - 17:00	3.7	3.4	2.9	3.1	2.1	2.4	2.0
17:00 - 18:00	3.9	1.6	3.0	2.9	5.1	1.8	1.6
18:00 - 19:00	3.2	3.4	3.2	3.2	4.2	2.3	1.8
19:00 - 20:00	4.1	3.0	3.1	3.1	4.7	4.4	1.7
20:00 - 21:00	4.4	2.2	2.8	4.0	3.2	2.2	4.1
21:00 - 22:00	2.2	1.9	3.9	2.5	3.5	1.9	3.9
22:00 - 23:00	4.9	3.2	3.4	1.6	5.1	3.6	3.9
23:00 - 00:00	2.0	5.1	2.3	4.1	1.7	2.0	3.9
00:00 - 01:00	5.0	4.0	2.6	1.6	2.3	4.1	3.6
01:00 - 02:00	3.0	4.9	4.6	4.6	1.9	3.6	2.5
02:00 - 03:00	3.6	3.0	4.6	3.2	3.0	4.0	2.4
03:00 - 04:00	4.0	2.0	3.0	4.6	4.7	4.2	3.3
04:00 - 05:00	5.0	4.7	2.6	4.2	2.1	4.3	3.7
05:00 - 06:00	4.8	2.3	3.0	3.2	5.1	2.4	4.3
06:00 - 07:00	2.0	3.7	3.2	4.3	4.4	5.0	3.3
07:00 - 08:00	4.1	2.1	1.6	3.1	2.7	3.1	3.8
08:00 - 09:00	4.3	3.7	3.6	1.6	3.7	1.9	4.0
09:00 - 10:00	2.5	3.1	1.5	1.6	2.9	2.6	5.0
10:00 - 11:00	4.9	4.5	4.7	3.3	4.5	3.8	3.2
11:00 - 12:00	1.6	2.4	1.5	3.9	4.1	4.2	3.7
Average-24Hr*	3.4	3.2	3.1	3.2	3.4	3.1	3.3
Max-1Hr	5.0	5.1	4.7	4.8	5.1	5.0	5.0
Min-1Hr	1.6	1.6	1.5	1.6	1.7	1.8	1.6
Standard-1Hr	300 ppb(780 ug/cu.m)						
Standard-24Hr	120 ppb(300 ug/cu.m)						

Remark : * Average time between 12:00-12:00

(Miss Katesarin Vorradetwittaya)
Environmental Scientist

Preeda S.
(Miss Preeda Somjai)
Technical Management Team



Ambient Air Monitoring Results : Sulfur dioxide

MTR-SPRC PLC-Refinery

Location : Map Ta Phut New Town

Monitor Period : 24 Nov 2025-01 Dec 2025

Analyzer Model : API 100A

Station No : SS2-09

Serial No : 342

Site Operator : Mr. Phuwadech Kaewjirakulsri

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)						
	24-25 Nov 2025	25-26 Nov 2025	26-27 Nov 2025	27-28 Nov 2025	28-29 Nov 2025	29-30 Nov 2025	30-01 Dec 2025
15:00 - 16:00	4.2	6.4	3.5	5.4	4.8	5.3	5.7
16:00 - 17:00	3.7	2.7	4.6	3.9	2.8	2.4	5.8
17:00 - 18:00	3.3	4.4	6.2	5.4	3.2	2.8	4.5
18:00 - 19:00	5.7	4.0	5.6	5.9	5.5	4.6	3.7
19:00 - 20:00	3.3	3.7	5.5	4.4	4.8	2.6	2.6
20:00 - 21:00	2.5	6.2	2.6	3.6	2.4	4.1	3.6
21:00 - 22:00	3.8	3.5	5.0	6.5	2.9	3.3	3.8
22:00 - 23:00	2.4	2.5	6.7	2.7	4.6	6.2	4.4
23:00 - 00:00	3.5	2.8	6.2	5.2	5.0	3.0	2.4
00:00 - 01:00	6.1	2.7	3.8	2.4	6.7	3.6	6.0
01:00 - 02:00	5.0	6.7	5.3	6.6	6.7	5.8	2.4
02:00 - 03:00	2.6	3.4	3.4	2.8	4.9	5.9	6.2
03:00 - 04:00	6.7	6.5	3.3	4.2	3.0	5.1	5.0
04:00 - 05:00	3.9	4.9	3.8	4.1	6.6	4.3	6.1
05:00 - 06:00	5.1	5.4	5.6	4.7	3.6	2.2	5.3
06:00 - 07:00	3.3	5.7	3.9	4.8	3.9	6.6	3.6
07:00 - 08:00	2.8	6.6	6.2	5.4	4.1	3.4	2.8
08:00 - 09:00	5.9	5.8	2.6	2.9	2.6	4.4	6.7
09:00 - 10:00	3.4	2.8	5.5	6.1	5.6	2.6	4.9
10:00 - 11:00	2.4	2.5	3.4	5.9	4.0	3.6	4.3
11:00 - 12:00	5.4	6.6	2.9	4.6	3.5	3.5	5.5
12:00 - 13:00	6.5	3.5	5.4	6.4	4.9	5.8	3.5
13:00 - 14:00	2.3	3.2	4.4	5.2	2.9	2.7	2.3
14:00 - 15:00	5.8	6.7	2.3	4.1	4.7	2.9	6.4
Average-24Hr*	4.2	4.6	4.5	4.7	4.3	4.0	4.5
Max-1Hr	6.7	6.7	6.7	6.6	6.7	6.6	6.7
Min-1Hr	2.3	2.5	2.3	2.4	2.4	2.2	2.3
Standard-1Hr	300 ppb(780 ug/cu.m)						
Standard-24Hr	120 ppb(300 ug/cu.m)						

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

(Miss Katesarin Vorradetwittaya)
Environmental Scientist

Preeda S.
(Miss Preeda Somjai)
Technical Management Team



Ambient Air Monitoring Results : Sulfur dioxide

MTR-SPRC PLC-Refinery

Location : Ban Plong Community

Monitor Period : 24 Nov 2025-01 Dec 2025

Analyzer Model : API 100A

Station No : SS2-07

Serial No : 1715

Site Operator : Mr. Phuwadech Kaewjirakulsri

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)						
	24-25 Nov 2025	25-26 Nov 2025	26-27 Nov 2025	27-28 Nov 2025	28-29 Nov 2025	29-30 Nov 2025	30-01 Dec 2025
13:00 - 14:00	4.5	4.8	5.5	5.2	5.2	5.7	4.7
14:00 - 15:00	3.2	4.3	4.0	5.4	4.8	2.4	5.5
15:00 - 16:00	2.8	4.7	2.6	4.5	4.7	3.5	2.9
16:00 - 17:00	4.9	4.9	5.6	2.9	4.6	4.5	3.4
17:00 - 18:00	5.6	4.2	5.1	2.9	5.0	5.7	5.1
18:00 - 19:00	2.6	3.8	4.5	5.4	4.9	4.5	3.2
19:00 - 20:00	4.8	3.6	3.9	3.4	5.6	5.1	5.0
20:00 - 21:00	4.7	4.8	6.0	2.7	5.2	2.9	4.4
21:00 - 22:00	4.1	2.6	4.3	3.4	4.3	4.6	3.2
22:00 - 23:00	5.6	2.6	4.8	3.5	5.6	5.0	3.7
23:00 - 00:00	5.9	5.3	5.0	4.0	3.2	5.6	5.3
00:00 - 01:00	3.8	5.6	5.7	4.2	3.5	5.6	4.1
01:00 - 02:00	3.7	3.5	5.6	5.6	5.2	5.5	5.7
02:00 - 03:00	3.2	3.5	4.4	5.3	2.8	4.9	5.1
03:00 - 04:00	4.0	5.3	5.5	4.2	2.8	2.7	6.0
04:00 - 05:00	3.9	5.5	3.6	4.9	2.4	3.9	6.0
05:00 - 06:00	3.9	5.9	4.1	5.5	3.0	4.5	5.4
06:00 - 07:00	3.2	3.8	2.4	4.8	4.3	5.4	3.5
07:00 - 08:00	2.4	2.7	4.5	3.9	2.7	2.3	4.0
08:00 - 09:00	3.9	3.7	4.5	5.8	5.8	4.4	4.2
09:00 - 10:00	4.2	5.2	3.8	2.5	5.7	4.5	4.3
10:00 - 11:00	5.6	4.8	3.1	4.9	5.5	5.7	4.8
11:00 - 12:00	2.6	5.4	4.1	3.8	4.3	3.5	5.1
12:00 - 13:00	3.8	5.6	3.4	4.0	3.1	5.1	2.3
Average-24Hr*	4.0	4.4	4.4	4.3	4.3	4.5	4.5
Max-1Hr	5.9	5.9	6.0	5.8	5.8	5.7	6.0
Min-1Hr	2.4	2.6	2.4	2.5	2.4	2.3	2.3
Standard-1Hr	300 ppb(780 ug/cu.m)						
Standard-24Hr	120 ppb(300 ug/cu.m)						

Remark : * Average time between 13:00-13:00


 (Miss Katesarin Vorradetwittaya)
 Environmental Scientist


 (Miss Preeda Somjai)
 Technical Management Team



Ambient Air Monitoring Results : Nitrogen dioxide

MTR-SPRC PLC-Refinery

Location : With in Refinery Plant, North

Monitor Period : 24 Nov 2025-01 Dec 2025

Analyzer Model : Thermo 42C

Station No : SS2-03

Serial No : 0426708263

Site Operator : Mr. Phuwadach Kaewjirakulsri

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	NO2 Concentration (ppb)						
	24-25 Nov 2025	25-26 Nov 2025	26-27 Nov 2025	27-28 Nov 2025	28-29 Nov 2025	29-30 Nov 2025	30-01 Dec 2025
12:00 - 13:00	6.2	5.3	5.8	5.9	6.7	6.0	4.3
13:00 - 14:00	5.7	5.5	4.8	6.7	6.6	4.5	5.2
14:00 - 15:00	6.1	5.7	4.6	5.5	5.0	6.3	5.2
15:00 - 16:00	6.6	5.6	5.3	5.8	6.8	5.4	5.0
16:00 - 17:00	6.6	4.8	4.6	5.6	5.5	5.8	5.7
17:00 - 18:00	6.0	5.5	4.9	4.4	6.5	6.2	5.0
18:00 - 19:00	4.9	5.1	4.5	5.0	6.0	6.0	6.2
19:00 - 20:00	5.1	4.7	4.3	4.6	5.7	4.1	5.5
20:00 - 21:00	6.2	6.3	4.5	4.7	4.8	5.7	4.4
21:00 - 22:00	6.0	5.8	6.2	4.2	5.0	4.0	4.2
22:00 - 23:00	5.9	5.6	4.6	6.5	6.5	6.5	5.3
23:00 - 00:00	6.6	6.6	4.7	4.1	5.5	4.3	5.4
00:00 - 01:00	6.7	6.0	5.7	6.7	4.8	5.3	4.8
01:00 - 02:00	6.1	6.2	5.0	4.2	6.1	5.7	6.6
02:00 - 03:00	6.1	6.7	5.8	6.2	4.7	5.2	6.4
03:00 - 04:00	5.8	4.4	4.9	6.1	5.6	6.4	4.4
04:00 - 05:00	6.2	5.7	6.6	6.3	4.4	6.8	6.7
05:00 - 06:00	6.3	5.5	5.0	6.2	4.2	4.1	6.5
06:00 - 07:00	5.3	6.3	5.8	6.4	4.3	6.6	5.9
07:00 - 08:00	4.5	4.7	5.7	4.1	6.2	6.2	5.8
08:00 - 09:00	6.3	6.2	6.7	6.2	4.2	4.8	5.5
09:00 - 10:00	6.6	6.7	5.3	5.5	4.6	6.2	5.8
10:00 - 11:00	6.8	5.4	5.7	6.3	5.9	5.9	6.0
11:00 - 12:00	4.4	5.7	6.1	5.7	5.0	4.4	4.6
Average-24Hr*	6.0	5.7	5.3	5.5	5.4	5.5	5.4
Max-1Hr	6.8	6.7	6.7	6.7	6.8	6.8	6.7
Min-1Hr	4.4	4.4	4.3	4.1	4.2	4.0	4.2
Standard-1Hr	170 ppb(320 ug/cu.m)						
Standard-24Hr	-						

Remark : * Average time between 12:00-12:00

(Miss Katesarin Vorradetwittaya)
 Environmental Scientist

(Miss Preeda Somjai)
 Technical Management Team



Ambient Air Monitoring Results : Nitrogen dioxide

MTR-SPRC PLC-Refinery

Location : Map Ta Phut New Town

Monitor Period : 24 Nov 2025-01 Dec 2025

Analyzer Model : API 200A

Station No : SS2-09

Serial No : 2384

Site Operator : Mr. Phuwadech Kaewjirakulsri

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)						
	24-25 Nov 2025	25-26 Nov 2025	26-27 Nov 2025	27-28 Nov 2025	28-29 Nov 2025	29-30 Nov 2025	30-01 Dec 2025
15:00 - 16:00	5.3	6.7	6.8	7.0	6.9	5.5	6.6
16:00 - 17:00	6.3	5.1	6.1	6.5	5.6	7.1	6.6
17:00 - 18:00	6.0	7.2	6.7	5.5	7.1	5.4	5.4
18:00 - 19:00	5.0	7.2	5.3	5.9	6.1	5.3	7.1
19:00 - 20:00	6.1	5.7	6.8	6.5	7.0	5.5	6.7
20:00 - 21:00	6.9	5.7	5.9	5.7	7.3	6.3	6.3
21:00 - 22:00	5.1	5.4	6.3	6.8	6.3	6.4	6.6
22:00 - 23:00	5.3	6.4	6.0	6.5	5.2	6.6	6.2
23:00 - 00:00	6.1	6.9	7.0	6.0	7.1	7.2	6.7
00:00 - 01:00	6.5	6.6	5.4	6.2	5.7	7.0	6.0
01:00 - 02:00	5.5	5.6	6.9	6.0	5.5	5.8	5.4
02:00 - 03:00	5.6	5.8	6.9	6.7	5.5	7.2	6.2
03:00 - 04:00	5.4	6.8	5.0	6.9	5.6	6.9	5.7
04:00 - 05:00	5.6	5.1	6.8	5.8	7.1	6.0	6.4
05:00 - 06:00	6.4	7.0	5.5	7.1	7.2	7.1	5.1
06:00 - 07:00	6.0	6.4	6.8	6.8	5.2	7.0	5.1
07:00 - 08:00	6.8	7.2	7.2	5.5	6.3	6.0	6.8
08:00 - 09:00	7.3	6.8	5.5	5.5	5.1	5.6	5.6
09:00 - 10:00	5.5	5.4	6.5	5.4	5.2	5.4	7.3
10:00 - 11:00	6.4	6.1	5.9	6.2	5.6	7.2	6.5
11:00 - 12:00	6.6	5.8	5.4	5.3	5.6	5.0	5.1
12:00 - 13:00	7.2	5.3	5.7	5.8	6.5	6.7	5.0
13:00 - 14:00	6.3	6.8	5.9	6.4	5.6	6.2	6.1
14:00 - 15:00	7.2	5.2	6.2	5.3	5.2	5.4	5.7
Average-24Hr*	6.1	6.2	6.2	6.1	6.1	6.2	6.1
Max-1Hr	7.3	7.2	7.2	7.1	7.3	7.2	7.3
Min-1Hr	5.0	5.1	5.0	5.3	5.1	5.0	5.0
Standard-1Hr	170 ppb(320 ug/cu.m)						
Standard-24Hr	-						

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

(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 : 24 Nov 2025-01 Dec 2025

Analyzer Model : API 200A

Station No : SS2-07

Serial No : 1505

Site Operator : Mr. Phuwadech Kaewjirakulsri

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)						
	24-25 Nov 2025	25-26 Nov 2025	26-27 Nov 2025	27-28 Nov 2025	28-29 Nov 2025	29-30 Nov 2025	30-01 Dec 2025
13:00 - 14:00	6.5	7.2	6.3	6.9	6.8	6.3	5.9
14:00 - 15:00	7.6	6.7	6.4	6.5	7.5	6.3	6.4
15:00 - 16:00	6.3	6.4	5.9	8.0	6.4	8.2	6.7
16:00 - 17:00	6.2	7.1	7.2	6.3	7.2	7.6	7.6
17:00 - 18:00	6.4	7.9	7.2	6.5	5.8	7.1	6.0
18:00 - 19:00	7.4	6.4	6.5	7.3	7.1	7.9	7.4
19:00 - 20:00	6.5	8.1	6.1	6.0	7.9	6.0	5.9
20:00 - 21:00	7.5	6.9	6.7	6.9	6.0	6.8	7.3
21:00 - 22:00	7.6	6.5	7.7	8.0	7.4	6.1	7.5
22:00 - 23:00	7.1	7.0	7.5	6.6	6.6	5.8	6.0
23:00 - 00:00	7.8	6.3	6.7	7.2	6.5	7.5	7.2
00:00 - 01:00	6.3	5.9	5.8	8.0	6.7	6.4	7.4
01:00 - 02:00	6.2	8.1	6.2	6.8	8.0	7.6	6.0
02:00 - 03:00	7.3	6.8	5.9	8.0	8.0	6.0	6.4
03:00 - 04:00	8.0	6.3	7.2	6.5	6.3	7.0	7.2
04:00 - 05:00	5.9	6.7	7.6	8.2	6.2	6.5	5.9
05:00 - 06:00	5.9	7.5	6.8	7.6	6.6	6.4	6.8
06:00 - 07:00	6.3	6.7	5.9	8.0	7.2	7.1	7.2
07:00 - 08:00	6.7	7.1	6.8	8.1	7.1	7.4	6.6
08:00 - 09:00	7.6	6.1	6.8	7.7	7.2	7.9	7.9
09:00 - 10:00	6.5	7.8	6.5	8.1	6.3	7.5	6.3
10:00 - 11:00	7.7	6.5	6.1	7.2	6.6	7.0	7.9
11:00 - 12:00	7.3	7.7	7.2	6.0	5.9	7.3	7.5
12:00 - 13:00	7.2	6.8	6.4	7.5	7.9	6.2	7.4
Average-24Hr*	6.9	6.9	6.6	7.2	6.9	6.9	6.8
Max-1Hr	8.0	8.1	7.7	8.2	8.0	8.2	7.9
Min-1Hr	5.9	5.9	5.8	6.0	5.8	5.8	5.9
Standard-1Hr	170 ppb(320 ug/cu.m)						
Standard-24Hr	-						

Remark : * Average time between 13:00-13:00

(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 : 24 Nov 2025-01 Dec 2025

Analyzer Model : Thermo 48C

Station No : SS2-03

Serial No : 362

Site Operator : Mr. Phuwadech Kaewjirakulsri

Calibrator Model : Teledyne 700E

Serial No : 587

Calibration Gas Cylinder I.D.: EB0102326

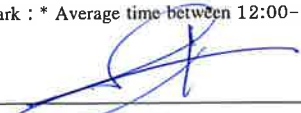
Certified Date : 08 Jan 2025


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

Expire Date : 07 Jan 2026

Time	CO Concentration (ppm)						
	24-25 Nov 2025	25-26 Nov 2025	26-27 Nov 2025	27-28 Nov 2025	28-29 Nov 2025	29-30 Nov 2025	30-01 Dec 2025
12:00 - 13:00	0.5	0.5	0.4	0.1	0.2	0.5	0.2
13:00 - 14:00	0.3	0.1	0.3	0.1	0.3	0.5	0.3
14:00 - 15:00	0.2	0.4	0.1	0.4	0.5	0.5	0.5
15:00 - 16:00	0.1	0.2	0.4	0.2	0.3	0.3	0.3
16:00 - 17:00	0.2	0.3	0.2	0.4	0.2	0.1	0.5
17:00 - 18:00	0.1	0.4	0.3	0.5	0.4	0.3	0.4
18:00 - 19:00	0.3	0.4	0.3	0.5	0.3	0.3	0.3
19:00 - 20:00	0.1	0.5	0.5	0.3	0.2	0.4	0.5
20:00 - 21:00	0.5	0.3	0.2	0.3	0.1	0.3	0.2
21:00 - 22:00	0.4	0.2	0.1	0.5	0.4	0.5	0.3
22:00 - 23:00	0.1	0.5	0.1	0.2	0.6	0.2	0.3
23:00 - 00:00	0.4	0.5	0.3	0.3	0.2	0.2	0.4
00:00 - 01:00	0.1	0.4	0.2	0.5	0.1	0.4	0.2
01:00 - 02:00	0.3	0.1	0.4	0.5	0.2	0.4	0.4
02:00 - 03:00	0.5	0.5	0.5	0.1	0.2	0.4	0.4
03:00 - 04:00	0.3	0.1	0.2	0.1	0.2	0.5	0.2
04:00 - 05:00	0.4	0.5	0.5	0.2	0.1	0.3	0.4
05:00 - 06:00	0.1	0.4	0.4	0.3	0.3	0.3	0.4
06:00 - 07:00	0.3	0.2	0.4	0.4	0.3	0.5	0.3
07:00 - 08:00	0.1	0.3	0.1	0.5	0.3	0.5	0.2
08:00 - 09:00	0.2	0.6	0.1	0.2	0.5	0.2	0.4
09:00 - 10:00	0.3	0.2	0.3	0.1	0.4	0.4	0.3
10:00 - 11:00	0.3	0.4	0.1	0.2	0.5	0.2	0.3
11:00 - 12:00	0.2	0.3	0.4	0.2	0.3	0.5	0.1
Average-24Hr*	0.3	0.3	0.3	0.3	0.3	0.4	0.3
Max-1Hr	0.5	0.6	0.5	0.5	0.6	0.5	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 12:00-12:00


 (Miss Katesarin Vorradetwittaya)
 Environmental Scientist


 (Miss Preeda Somjai)
 Technical Management Team



Ambient Air Monitoring Results : Carbon monoxide

MTR-SPRC PLC-Refinery

Location : Map Ta Phut New Town

Monitor Period : 24 Nov 2025-01 Dec 2025

Analyzer Model : Thermo 48C

Station No : SS2-09

Serial No : 0507710894

Site Operator : Mr. Phuwadech Kaewjirakulsri

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)						
	24-25 Nov 2025	25-26 Nov 2025	26-27 Nov 2025	27-28 Nov 2025	28-29 Nov 2025	29-30 Nov 2025	30-01 Dec 2025
15:00 - 16:00	0.6	0.5	0.6	0.3	0.2	0.4	0.3
16:00 - 17:00	0.2	0.6	0.2	0.2	0.3	0.5	0.4
17:00 - 18:00	0.3	0.3	0.2	0.5	0.3	0.3	0.4
18:00 - 19:00	0.3	0.3	0.5	0.2	0.3	0.4	0.5
19:00 - 20:00	0.4	0.4	0.5	0.3	0.2	0.1	0.4
20:00 - 21:00	0.1	0.3	0.4	0.4	0.2	0.1	0.4
21:00 - 22:00	0.5	0.3	0.4	0.3	0.2	0.2	0.4
22:00 - 23:00	0.6	0.4	0.4	0.5	0.4	0.1	0.1
23:00 - 00:00	0.2	0.1	0.4	0.4	0.3	0.5	0.3
00:00 - 01:00	0.5	0.4	0.2	0.3	0.2	0.5	0.3
01:00 - 02:00	0.6	0.2	0.5	0.4	0.5	0.5	0.2
02:00 - 03:00	0.5	0.5	0.2	0.4	0.3	0.6	0.3
03:00 - 04:00	0.1	0.3	0.5	0.4	0.5	0.2	0.2
04:00 - 05:00	0.3	0.4	0.5	0.6	0.4	0.2	0.2
05:00 - 06:00	0.2	0.4	0.4	0.3	0.2	0.3	0.5
06:00 - 07:00	0.6	0.6	0.5	0.3	0.2	0.3	0.6
07:00 - 08:00	0.6	0.2	0.5	0.2	0.5	0.4	0.2
08:00 - 09:00	0.3	0.2	0.2	0.5	0.2	0.4	0.4
09:00 - 10:00	0.6	0.6	0.4	0.3	0.5	0.5	0.4
10:00 - 11:00	0.6	0.5	0.6	0.4	0.2	0.5	0.2
11:00 - 12:00	0.3	0.5	0.6	0.3	0.1	0.6	0.2
12:00 - 13:00	0.6	0.3	0.5	0.5	0.4	0.6	0.2
13:00 - 14:00	0.4	0.4	0.5	0.4	0.4	0.5	0.4
14:00 - 15:00	0.2	0.6	0.3	0.6	0.2	0.4	0.5
Average-24Hr*	0.4	0.4	0.4	0.4	0.3	0.4	0.3
Max-1Hr	0.6	0.6	0.6	0.6	0.5	0.6	0.6
Min-1Hr	0.1	0.1	0.2	0.2	0.1	0.1	0.1
Standard-1Hr	30 ppm(34.2 mg/cu.m)						
Standard-24Hr	-						

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


 (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 : 24 Nov 2025-01 Dec 2025

Analyzer Model : API 300A

Station No : SS2-07

Serial No : CO-04

Site Operator : Mr. Phuwadech Kaewjirakulsri

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)						
	24-25 Nov 2025	25-26 Nov 2025	26-27 Nov 2025	27-28 Nov 2025	28-29 Nov 2025	29-30 Nov 2025	30-01 Dec 2025
13:00 - 14:00	0.4	0.3	0.2	0.3	0.7	0.7	0.2
14:00 - 15:00	0.2	0.2	0.2	0.5	0.5	0.5	0.4
15:00 - 16:00	0.4	0.4	0.2	0.5	0.4	0.4	0.6
16:00 - 17:00	0.3	0.5	0.5	0.3	0.4	0.2	0.2
17:00 - 18:00	0.7	0.7	0.5	0.7	0.7	0.4	0.2
18:00 - 19:00	0.3	0.2	0.3	0.3	0.2	0.2	0.5
19:00 - 20:00	0.2	0.6	0.7	0.3	0.6	0.7	0.4
20:00 - 21:00	0.4	0.4	0.4	0.6	0.2	0.2	0.6
21:00 - 22:00	0.2	0.3	0.4	0.3	0.7	0.2	0.3
22:00 - 23:00	0.5	0.4	0.4	0.4	0.2	0.3	0.5
23:00 - 00:00	0.7	0.3	0.2	0.3	0.5	0.2	0.2
00:00 - 01:00	0.4	0.2	0.3	0.4	0.7	0.6	0.5
01:00 - 02:00	0.3	0.4	0.3	0.6	0.5	0.3	0.3
02:00 - 03:00	0.6	0.6	0.6	0.2	0.4	0.5	0.5
03:00 - 04:00	0.6	0.2	0.5	0.5	0.3	0.2	0.6
04:00 - 05:00	0.4	0.5	0.3	0.3	0.4	0.4	0.3
05:00 - 06:00	0.5	0.7	0.2	0.4	0.6	0.7	0.2
06:00 - 07:00	0.5	0.6	0.4	0.7	0.6	0.3	0.7
07:00 - 08:00	0.6	0.5	0.3	0.6	0.2	0.3	0.6
08:00 - 09:00	0.6	0.6	0.7	0.6	0.4	0.6	0.7
09:00 - 10:00	0.6	0.2	0.2	0.4	0.3	0.5	0.6
10:00 - 11:00	0.6	0.4	0.4	0.6	0.4	0.5	0.2
11:00 - 12:00	0.6	0.7	0.4	0.4	0.3	0.2	0.7
12:00 - 13:00	0.2	0.4	0.3	0.4	0.3	0.4	0.4
Average-24Hr*	0.5	0.4	0.4	0.4	0.4	0.4	0.4
Max-1Hr	0.7	0.7	0.7	0.7	0.7	0.7	0.7
Min-1Hr	0.2	0.2	0.2	0.2	0.2	0.2	0.2
Standard-1Hr	30 ppm(34.2 mg/cu.m)						
Standard-24Hr							

Remark : * Average time between 13:00-13:00


 (Miss Katesarin Vorradetwittaya)
 Environmental Scientist


 (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-2511-0069
SAMPLING BY	: SECOT Co., Ltd.	SAMPLING DATE	: 25-27/11/2025
RECEIVE DATE	: 08/12/2025	ANALYTICAL DATE	: 11/12/2025
REPORT DATE	: 23/12/2025	SAMPLE CONDITION	: Normal
INSTRUMENT	: Impingment Absorption	SITE OPERATOR	: Mr. Phuwadech Kaewjirakulsri
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	25/11/2025	ppm	<0.001	ND	ND	ND	Intersociety Committee
	26/11/2025	ppm	<0.001	ND	ND	ND	Method 701
	27/11/2025	ppm	<0.001	ND	ND	ND	

Pornnapa Budthum

(Miss Pornnapa Budthum)

Analyst

Narisa Poowasanpetch

(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-2511-0069
SAMPLING BY	: SECOT Co., Ltd.	SAMPLING DATE	: 24/11/2025-01/12/2025
RECEIVED DATE	: 08/12/2025	ANALYTICAL DATE	: 08-10/12/2025
REPORT DATE	: 12/12/2025	SAMPLE CONDITION	: Normal
OPERATOR	: Mr. Phuwadech Kaewjirakulsri		
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.)	24-25/11/2025	mg/m ³	0.033	0.036	0.034	0.330	High Volume
	25-26/11/2025	mg/m ³	0.047	0.042	0.034		Air Sampler/
	26-27/11/2025	mg/m ³	0.044	0.037	0.037		Gravimetric
	27-28/11/2025	mg/m ³	0.050	0.052	0.045		Method
	28-29/11/2025	mg/m ³	0.060	0.045	0.053		
	29-30/11/2025	mg/m ³	0.064	0.065	0.066		
	30/11/2025-01/12/2025	mg/m ³	0.068	0.063	0.053		



(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-2511-0069
SAMPLING BY : SECOT Co., Ltd. SAMPLING DATE : 24/11/2025-01/12/2025
RECEIVED DATE : 08/12/2025 ANALYTICAL DATE : 08-10/12/2025
REPORT DATE : 12/12/2025 SAMPLE CONDITION : Normal
OPERATOR : Mr. Phuwadech Kaewjirakulsri
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.)	24-25/11/2025	mg/m ³	0.022	0.017	0.030	0.120	High Volume
	25-26/11/2025	mg/m ³	0.030	0.032	0.021		Air Sampler
	26-27/11/2025	mg/m ³	0.023	0.025	0.025		(Hi-Vol PM-10
	27-28/11/2025	mg/m ³	0.040	0.017	0.033		Size Selective Inlet)
	28-29/11/2025	mg/m ³	0.022	0.027	0.043		Gravimetric
	29-30/11/2025	mg/m ³	0.050	0.031	0.054		Method
	30/11/2025-01/12/2025	mg/m ³	0.051	0.035	0.043		

Pornnapa Budthum

(Miss Pornnapa Budthum)

Analyst

Narisa Poowasanpetch

(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.	: 1206/68
SAMPLING BY	: SECOT Co., Ltd.	SAMPLING METHOD	: Subatmospheric Pressure Sampling
SAMPLING DATE	: 01-02/07/2025	ANALYTICAL DATE	: 11/07/2025
SAMPLING TIME	: 13:30-12:50	SAMPLE CONDITION	: Normal
RECEIVED DATE	: 03/07/2025	FILE CODE	: 225003_TO-15_July
REPORT DATE	: 11/07/2025		

Compound	SAMPLING LOCATION				STANDARD* (µg/m ³)
	Non Detection		Map Ta Phut New Town		
	ppbv	µg/m ³	ppbv	µg/m ³	
Benzene	0.004	0.013	4.43	14.15	7.6

Methods for the Determination of Toxic Organic Compound in Ambient Air, 2nd : 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.	: 1400/68
SAMPLING BY	: SECOT Co., Ltd.	SAMPLING METHOD	: Subatmospheric Pressure Sampling
SAMPLING DATE	: 01-02/08/2025	ANALYTICAL DATE	: 08/08/2025
SAMPLING TIME	: 13:58-14:30	SAMPLE CONDITION	: Normal
RECEIVED DATE	: 03/08/2025	FILE CODE	: 225003_TO-15_August
REPORT DATE	: 11/08/2025		

Compound	SAMPLING LOCATION				STANDARD* (µg/m ³)
	Non Detection		Map Ta Phut New Town		
	ppbv	µg/m ³	ppbv	µg/m ³	
Benzene	0.004	0.013	1.12	3.58	7.6

Methods for the Determination of Toxic Organic Compound in Ambient Air, 2nd ed. : 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.	: 1688/68
SAMPLING BY	: SECOT Co., Ltd.	SAMPLING METHOD	: Subatmospheric Pressure Sampling
SAMPLING DATE	: 04-05/09/2025	ANALYTICAL DATE	: 09/09/2025
SAMPLING TIME	: 11:08-10:33	SAMPLE CONDITION	: Normal
RECEIVED DATE	: 06/09/2025	FILE CODE	: 225003_TO-15_September
REPORT DATE	: 11/09/2025		

Compound	SAMPLING LOCATION				STANDARD* (µg/m ³)
	Non Detection		Map Ta Phut New Town		
	ppbv	µg/m ³	ppbv	µg/m ³	
Benzene	0.004	0.013	3.97	12.68	7.6

Methods for the Determination of Toxic Organic Compound in Ambient Air, 2nd : 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

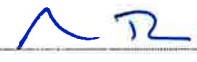
CLIENT NAME	: Star Petroleum Refining Public Co., Ltd.	REQUEST SERVICE No.	: 1871/68
SAMPLING BY	: SECOT Co., Ltd.	SAMPLING METHOD	: Subatmospheric Pressure Sampling
SAMPLING DATE	: 01-02/10/2025	ANALYTICAL DATE	: 07/10/2025
SAMPLING TIME	: 15:25-15:29	SAMPLE CONDITION	: Normal
RECEIVED DATE	: 03/10/2025	FILE CODE	: 225003_TO-15_October
REPORT DATE	: 09/10/2025		

Compound	Non Detection		SAMPLING LOCATION		STANDARD* ($\mu\text{g}/\text{m}^3$)
			Map Ta Phut New Town		
	ppbv	$\mu\text{g}/\text{m}^3$	ppbv	$\mu\text{g}/\text{m}^3$	
Benzene	0.004	0.013	0.67	2.14	7.6

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


(Miss Siriwan Chimsa-nga)

Analyst


(Mrs. Araya Tipparuk)

Technical Management Team

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

AMBIENT AIR QUALITY ANALYSIS REPORT

CLIENT NAME	: Star Petroleum Refining Public Co., Ltd.	REQUEST SERVICE No.	: 2099/68
SAMPLING BY	: SECOT Co., Ltd.	SAMPLING METHOD	: Subatmospheric Pressure Sampling
SAMPLING DATE	: 04-05/11/2025	ANALYTICAL DATE	: 07/11/2025
SAMPLING TIME	: 09:28-10:28	SAMPLE CONDITION	: Normal
RECEIVED DATE	: 06/11/2025	FILE CODE	: 225003_TO-15_November
REPORT DATE	: 11/11/2025		

Compound	SAMPLING LOCATION				STANDARD* ($\mu\text{g}/\text{m}^3$)
	Non Detection		Map Ta Phut New Town		
	ppbv	$\mu\text{g}/\text{m}^3$	ppbv	$\mu\text{g}/\text{m}^3$	
Benzene	0.004	0.013	0.60	1.92	7.6

Methods for the Determination of Toxic Organic Compound in Ambient Air, 2nd : 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.	: 2299/68
SAMPLING BY	: SECOT Co., Ltd.	SAMPLING METHOD	: Subatmospheric Pressure Sampling
SAMPLING DATE	: 02-03/12/2025	ANALYTICAL DATE	: 09/12/2025
SAMPLING TIME	: 10:10-11:20	SAMPLE CONDITION	: Normal
RECEIVED DATE	: 04/12/2025	FILE CODE	: 225003_TO-15_December
REPORT DATE	: 10/12/2025		

Compound	SAMPLING LOCATION				STANDARD* (µg/m ³)
	Non Detection		Map Ta Phut New Town		
	ppbv	µg/m ³	ppbv	µg/m ³	
Benzene	0.004	0.013	1.63	5.21	7.6

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


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AMBIENT AIR QUALITY ANALYSIS REPORT

CLIENT NAME	: Star Petroleum Refining Public Co., Ltd.	REQUEST SERVICE No.	: 1206/68
SAMPLING BY	: SECOT Co., Ltd.	SAMPLING METHOD	: Subatmospheric Pressure Sampling
SAMPLING DATE	: 01-02/07/2025	ANALYTICAL DATE	: 11/07/2025
SAMPLING TIME	: 11:39-11:13	SAMPLE CONDITION	: Normal
RECEIVED DATE	: 03/07/2025	FILE CODE	: 225003_TO-15_July
REPORT DATE	: 11/07/2025		

Compound	SAMPLING LOCATION				STANDARD* (µg/m ³)
	Non Detection		Ban Plong Community		
	ppbv	µg/m ³	ppbv	µg/m ³	
Benzene	0.004 *	0.013	3.69	11.79	7.6

Methods for the Determination of Toxic Organic Compound in Ambient Air, 2nd : 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.	: 1400/68
SAMPLING BY	: SECOT Co., Ltd.	SAMPLING METHOD	: Subatmospheric Pressure Sampling
SAMPLING DATE	: 01-02/08/2025	ANALYTICAL DATE	: 08/08/2025
SAMPLING TIME	: 15:37-14:51	SAMPLE CONDITION	: Normal
RECEIVED DATE	: 03/08/2025	FILE CODE	: 225003_TO-15_August
REPORT DATE	: 11/08/2025		

Compound	SAMPLING LOCATION				STANDARD* (µg/m ³)
	Non Detection		Ban Plong Community		
	ppbv	µg/m ³	ppbv	µg/m ³	
Benzene	0.004	0.013	3.33	10.64	7.6

Methods for the Determination of Toxic Organic Compound in Ambient Air, 2nd : 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.	: 1688/68
SAMPLING BY	: SECOT Co., Ltd.	SAMPLING METHOD	: Subatmospheric Pressure Sampling
SAMPLING DATE	: 04-05/09/2025	ANALYTICAL DATE	: 09/09/2025
SAMPLING TIME	: 10:59-10:23	SAMPLE CONDITION	: Normal
RECEIVED DATE	: 06/09/2025	FILE CODE	: 225003_TO-15_September
REPORT DATE	: 11/09/2025		

Compound	SAMPLING LOCATION				STANDARD* (µg/m ³)
	Non Detection		Ban Plong Community		
	ppbv	µg/m ³	ppbv	µg/m ³	
Benzene	0.004	0.013	0.52	1.66	7.6

Methods for the Determination of Toxic Organic Compound in Ambient Air, 2nd : 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.	: 1871/68
SAMPLING BY	: SECOT Co., Ltd.	SAMPLING METHOD	: Subatmospheric Pressure Sampling
SAMPLING DATE	: 01-02/10/2025	ANALYTICAL DATE	: 07/10/2025
SAMPLING TIME	: 13:40-12:50	SAMPLE CONDITION	: Normal
RECEIVED DATE	: 03/10/2025	FILE CODE	: 225003_TO-15_October
REPORT DATE	: 09/10/2025		

Compound	Non Detection		SAMPLING LOCATION		STANDARD* (µg/m ³)
	Ban Plong Community				
	ppbv	µg/m ³	ppbv	µg/m ³	
Benzene	0.004	0.013	0.73	2.33	7.6

Methods for the Determination of Toxic Organic Compound in Ambient Air, 2nd ed. : 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.	: 2099/68
SAMPLING BY	: SECOT Co., Ltd.	SAMPLING METHOD	: Subatmospheric Pressure Sampling
SAMPLING DATE	: 04-05/11/2025	ANALYTICAL DATE	: 07/11/2025
SAMPLING TIME	: 10:30-11:01	SAMPLE CONDITION	: Normal
RECEIVED DATE	: 06/11/2025	FILE CODE	: 225003_TO-15_November
REPORT DATE	: 11/11/2025		

Compound	Non Detection		SAMPLING LOCATION		STANDARD* (µg/m ³)
			Ban Plong Community		
	ppbv	µg/m ³	ppbv	µg/m ³	
Benzene	0.004	0.013	0.73	2.34	7.6

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


(Miss Siriwan Chimsa-ngu)

Analyst



(Mrs. Araya Tipparuk)

Technical Management Team

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

AMBIENT AIR QUALITY ANALYSIS REPORT

CLIENT NAME	: Star Petroleum Refining Public Co., Ltd.	REQUEST SERVICE No.	: 2299/68
SAMPLING BY	: SECOT Co., Ltd.	SAMPLING METHOD	: Subatmospheric Pressure Sampling
SAMPLING DATE	: 02-03/12/2025	ANALYTICAL DATE	: 09/12/2025
SAMPLING TIME	: 10:11-10:33	SAMPLE CONDITION	: Normal
RECEIVED DATE	: 04/12/2025	FILE CODE	: 225003_TO-15_December
REPORT DATE	: 10/12/2025		

Compound	SAMPLING LOCATION				STANDARD* (µg/m ³)
	Non Detection		Ban Plong Community		
	ppbv	µg/m ³	ppbv	µg/m ³	
Benzene	0.004	0.013	1.22	3.90	7.6

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

Siriwan Chimsa-nga
(Miss Siriwan Chimsa-nga)

Analyst

Araya Tipparuk

(Mrs. Araya Tipparuk)

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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-2511-0075
SAMPLING BY	: SECOT Co., Ltd.	REGISTRATION NO.	: ๓-239
SAMPLING DATE	: 28/11/2025	SAMPLING TIME	: 02.50-04.50 p.m.
RECEIVED DATE	: 01/12/2025	ANALYTICAL DATE	: 02-04/12/2025
REPORT DATE	: 09/12/2025	SAMPLE CONDITION	: Normal
SOURCE DESCRIPTION	: Combustion	SITE OPERATOR	: Mr. Kittipong Thakoengsuk
FUEL TYPE	: Natural Gas + Refinery Fuel Gas	REGISTRATION NO.	: ๓-239-0024
STACK LOCATION	: RFCCU Stack (UTM : 734010E, 1405310N)		

STACK DESCRIPTION

Height	: 70	m	Flow Rate ⁽¹⁾	: 3,827	Ncu.m/min
Diameter	: 3.2	m	Excess Oxygen	: 4.26	%
Temperature	: 292.42	°C	Moisture Content	: 14.17	%
Gas Velocity	: 17.62	m/s			

PARAMETER	RESULTS ⁽¹⁾		EIA ⁽²⁾ / STANDARD ⁽³⁾		EMISSION RATE		REFERENCE METHOD
	mg/Ncu.m		mg/Ncu.m		g/s		
	4.26%O ₂	7%O ₂	7%O ₂	RESULT	EIA ⁽²⁾		
Particulate Matter (PM)	103.58	86.52	240/320	6.607	22.200	US. EPA Method 5	



(Miss Pornnapa Budthum)

Analyst

REG.NO.๓-239-๓-0018



(Miss Narisa Poowasanpetch)

Technical Management Team

REG.NO.๓-239-๓-0010

- Remark :**
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 3. ⁽¹⁾ At standard pressure of 760 mmHg and temperature of 25 °C, dry basis.
 4. ⁽²⁾ Assigned value in EIA Report Expansion 3 of Refinery Plant, B.E. 2561 (2018).
 5. ⁽³⁾ 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-2511-0075
SAMPLING BY	: SECOT Co., Ltd.	REGISTRATION NO.	: ๓-239
SAMPLING DATE	: 28/11/2025	SAMPLING TIME	: 02.50-04.50 p.m.
RECEIVED DATE	: 01/12/2025	ANALYTICAL DATE	: 01-11/12/2025
REPORT DATE	: 26/12/2025	SAMPLE CONDITION	: Normal
SOURCE DESCRIPTION	: Combustion	SITE OPERATOR	: Mr. Kittipong Thakoengsuk
FUEL TYPE	: Natural Gas + Refinery Fuel Gas	REGISTRATION NO.	: ๓-239-0024
STACK LOCATION	: RFCCU Stack (UTM : 734010E, 1405310N)		

STACK DESCRIPTION

Height	: 70	m	Flow Rate ⁽¹⁾	: 3,827	Ncu.m/min
Diameter	: 3.2	m	Excess Oxygen	: 4.26	%
Temperature	: 292.42	°C	Moisture Content	: 14.17	%
Gas Velocity	: 17.62	m/s			

PARAMETER	RESULTS ⁽¹⁾		EIA ⁽²⁾ / STANDARD ⁽³⁾	EMISSION RATE		REFERENCE METHOD
	mg/Ncu.m		mg/Ncu.m	g/s		
	4.26%O ₂	7%O ₂	7%O ₂	RESULT	EIA ⁽²⁾	
Mercury (Hg)	ND (<0.0003)	ND (<0.0003)	2.4/2.4	<0.00002	0.270	US, EPA Method 29
Lead (Pb)	ND (<0.02)	ND (<0.02)	5.0/5.0	<0.001	0.560	US, EPA Method 29

(Mrs. Araya Tipparuk)

Analyst

REG.NO.๓-239-๓-0004

(Miss Narisa Poowasanpetch)

Technical Management Team

REG.NO.๓-239-๓-0010

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 3. ⁽¹⁾ At standard pressure of 760 mmHg and temperature of 25 °C, dry basis.
 4. ⁽²⁾ Assigned value in EIA Report Expasion 3 of Refinery Plant, B.E. 2561 (2018).
 5. ⁽³⁾ 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-2511-0075
SAMPLING BY	: SECOT Co., Ltd.	REGISTRATION NO.	: ๓-239
SAMPLING DATE	: 28/11/2025	SAMPLING TIME	: 02.50-04.50 p.m.
RECEIVED DATE	: 06/12/2025	ANALYTICAL DATE	: 15/12/2025-12/01/2026
REPORT DATE	: 12/01/2026	SAMPLE CONDITION	: Normal
SOURCE DESCRIPTION	: Combustion	SITE OPERATOR	: Mr. Kittipong Thakoengsuk
FUEL TYPE	: Natural Gas + Refinery Fuel Gas	REGISTRATION NO.	: ๓-239-0024
STACK LOCATION	: RFCCU Stack (UTM : 734010E, 1405310N)		

STACK DESCRIPTION

Height	: 70	m	Flow Rate ⁽¹⁾	: 3,827	Ncu.m/min
Diameter	: 3.2	m	Excess Oxygen	: 4.26	%
Temperature	: 292.42	°C	Moisture Content	: 14.17	%
Gas Velocity	: 17.62	m/s			

PARAMETER	RESULT ⁽¹⁾				EIA ⁽²⁾ / STANDARD ⁽³⁾		EMISSION RATE		REFERENCE METHOD
	ppm		mg/Ncu.m.		ppm	mg/Ncu.m.	g/s		
	4.26%O ₂	7%O ₂	4.26%O ₂	7%O ₂	7%O ₂	7%O ₂	RESULT	EIA ⁽²⁾	
Sulfur Dioxide (SO ₂)	478.68	399.78	1,252.99	1,046.46	700/700	1,832/1,832	79.925	149.000	US. EPA Method 6C
Oxide of Nitrogen (NO _x)	159.15	132.92	299.42	250.07	250/400	113 / 226	19.100	23.010	US. EPA Method 7E
Carbon Monoxide (CO)	311.35	260.03	356.56	297.78	554/690	634/790	22.744	24.320	US. EPA Method 10

(Miss Katesarin Vorradetwittaya)

Environmental Scientist

REG.NO. ๓-239-๓-0006

(Miss Preeda Somjai)

Technical Management Team

REG.NO. ๓-239-๓-0006

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

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

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



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The Monitoring Result of Emission Concentration
RFCCU
Star Petroleum Refining Public Co., Ltd.
November 28, 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	4.41	4.40	152.17	152.33	128.33
2	3.98	3.94	164.23	164.39	134.73
3	4.49	4.43	160.60	160.73	135.65
Average	4.29	4.26	159.00	159.15	132.92

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	4.41	4.40	443.28	443.63	373.72
2	3.98	3.94	490.18	490.49	401.99
3	4.49	4.43	501.68	501.92	423.60
Average	4.29	4.26	478.38	478.68	399.78

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	4.41	4.40	311.85	311.99	262.83
2	3.98	3.94	304.47	304.63	249.67
3	4.49	4.43	317.25	317.44	267.91
Average	4.29	4.26	311.19	311.35	260.03



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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

Star Petroleum Refining Public Co., Ltd. Emission Test Result

Run # : 1

Date: 28 November 2025

Location : RFCCU

Start time: 3:00 PM

Finish time : 3:20 PM

O₂ instrument Model: AMI 70

Serial No.: 121121-10

NO_x instrument Model: API 200 AH

Serial No.: 441

SO₂ instrument Model: API 100 AH

Serial No.: 058

CO instrument Model: THERMO 48 C

Serial No.: 70162-365

Fuel Type : Fuel Gas

Test Operator : Song H.

Time, min	O ₂ (%)	NO _x (ppm)	SO ₂ (ppm)	CO (ppm)
3:00 PM	4.76	143.02	315.24	290.18
3:01 PM	4.66	143.81	337.87	291.82
3:02 PM	4.57	144.44	357.08	297.19
3:03 PM	4.45	144.75	373.43	294.37
3:04 PM	4.33	145.65	385.49	334.23
3:05 PM	4.30	147.21	396.66	348.34
3:06 PM	4.33	148.24	408.45	287.19
3:07 PM	4.42	148.20	418.73	296.72
3:08 PM	4.44	148.65	428.96	304.21
3:09 PM	4.50	148.46	438.62	316.62
3:10 PM	4.52	148.86	448.31	323.72
3:11 PM	4.54	149.40	458.22	309.65
3:12 PM	4.51	150.45	469.23	317.27
3:13 PM	4.46	153.99	483.96	309.47
3:14 PM	4.30	164.72	497.92	323.31
3:15 PM	4.26	165.58	511.40	324.37
3:16 PM	4.21	161.84	525.04	316.24
3:17 PM	4.26	159.65	523.82	322.38
3:18 PM	4.29	159.58	513.38	297.83
3:19 PM	4.22	158.93	507.23	301.26
3:20 PM	4.18	160.14	509.83	342.38
Average	4.41	152.17	443.28	311.85

Signature

Miss Katesarin Vorradetwittaya

Environmental Scientist



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Star Petroleum Refining Public Co., Ltd. Emission Test Result

Date:	28 November 2025	Run # :	2
Start time:	3:21 PM	Location :	RFCCU
O₂ instrument Model:	AMI 70	Finish time :	3:41 PM
NO_x instrument Model:	API 200 AH	Serial No.:	121121-10
SO₂ instrument Model:	API 100 AH	Serial No.:	441
CO instrument Model:	THERMO 48 C	Serial No.:	058
Fuel Type :	Fuel Gas	Serial No.:	70162-365
		Test Operator :	Song H.

Time, min	O ₂ (%)	NO _x (ppm)	SO ₂ (ppm)	CO (ppm)
3:21 PM	4.09	160.61	512.62	325.39
3:22 PM	4.01	160.28	516.42	312.20
3:23 PM	3.99	161.69	551.05	313.62
3:24 PM	3.99	162.43	527.36	313.61
3:25 PM	3.96	161.75	491.52	306.34
3:26 PM	3.95	163.45	511.83	312.61
3:27 PM	3.91	163.52	523.09	310.84
3:28 PM	3.81	164.09	517.72	308.43
3:29 PM	3.83	163.62	465.23	307.93
3:30 PM	3.80	164.30	463.48	302.98
3:31 PM	3.89	165.28	473.93	302.15
3:32 PM	3.93	164.99	523.92	302.23
3:33 PM	3.88	164.84	474.28	301.06
3:34 PM	3.89	164.21	482.74	296.39
3:35 PM	3.94	164.47	473.48	294.98
3:36 PM	4.01	164.62	462.29	285.07
3:37 PM	4.06	164.16	465.74	284.15
3:38 PM	4.11	163.57	449.54	285.32
3:39 PM	4.20	163.25	467.27	291.07
3:40 PM	4.25	167.35	485.23	314.27
3:41 PM	4.15	176.32	454.98	323.28
Average	3.98	164.23	490.18	304.47

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Miss Katesarin Vorradetwittaya

Environmental Scientist



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Star Petroleum Refining Public Co., Ltd. Emission Test Result

Run # : 3

Date: 28 November 2025

Location : RFCCU

Start time: 3:42 PM

Finish time : 4:02 PM

O₂ instrument Model: AMI 70

Serial No.: 121121-10

NO_x instrument Model: API 200 AH

Serial No.: 441

SO₂ instrument Model: API 100 AH

Serial No.: 058

CO instrument Model: THERMO 48 C

Serial No.: 70162-365

Fuel Type : Fuel Gas

Test Operator : Song H.

Time, min	O ₂ (%)	NO _x (ppm)	SO ₂ (ppm)	CO (ppm)
3:42 PM	4.05	173.16	471.32	318.27
3:43 PM	4.23	168.93	480.02	327.73
3:44 PM	4.41	166.37	491.65	322.83
3:45 PM	4.45	163.39	501.46	326.35
3:46 PM	4.47	161.72	510.92	317.28
3:47 PM	4.58	161.12	519.05	297.81
3:48 PM	4.59	160.92	521.73	316.27
3:49 PM	4.61	160.56	521.96	327.12
3:50 PM	4.64	158.57	520.64	324.48
3:51 PM	4.84	159.98	519.39	313.89
3:52 PM	4.78	162.15	524.35	318.26
3:53 PM	4.58	162.46	520.72	338.21
3:54 PM	4.46	161.66	515.82	298.46
3:55 PM	4.42	160.35	508.36	312.72
3:56 PM	4.46	159.38	498.95	309.26
3:57 PM	4.49	158.50	490.45	312.38
3:58 PM	4.56	157.56	478.22	316.27
3:59 PM	4.61	156.05	463.46	320.37
4:00 PM	4.34	154.62	452.23	318.62
4:01 PM	4.28	153.77	516.12	313.29
4:02 PM	4.38	151.39	508.41	312.37
Average	4.49	160.60	501.68	317.25

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-2511-0075
SAMPLING BY	: SECOT Co., Ltd.	REGISTRATION NO.	: 3-239
SAMPLING DATE	: 03/12/2025	SAMPLING TIME	: 03.00-04.05 p.m.
RECEIVED DATE	: 05/12/2025	ANALYTICAL DATE	: 08-09/12/2025
REPORT DATE	: 12/12/2025	SAMPLE CONDITION	: Normal
SOURCE DESCRIPTION	: Combustion	SITE OPERATOR	: Mr. Kittipong Thakoengsuk
FUEL TYPE	: Natural Gas + Refinery Fuel Gas	REGISTRATION NO.	: 3-239-0024
STACK LOCATION	: CDU Stack (UTM : 734410E, 140510N)		

STACK DESCRIPTION

Height	: 63.2	m	Flow Rate ⁽¹⁾	: 1,976	Ncu.m/min
Diameter	: 3.0	m	Excess Oxygen	: 5.03	%
Temperature	: 189.75	°C	Moisture Content	: 12.05	%
Gas Velocity	: 8.27	m/s			

PARAMETER	RESULTS ⁽¹⁾		EIA ⁽²⁾ / STANDARD ⁽³⁾	EMISSION RATE		REFERENCE METHOD
	mg/Ncu.m		mg/Ncu.m	g/s		
	5.03%O ₂	7%O ₂	7%O ₂	RESULT	EIA ⁽²⁾	
Particulate Matter (PM)	3.01	2.64	60/60	0.099	0.510	US. EPA Method 5



(Miss Pornnapa Budthum)

Analyst

REG.NO.3-239-ก-0018



(Miss Narisa Poowasanpet)

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. ⁽¹⁾ At standard pressure of 760 mmHg and temperature of 25 °C, dry basis.
 4. ⁽²⁾ Assigned value in EIA Report Expasion 3 of Refinery Plant, B.E. 2561 (2018).
 5. ⁽³⁾ 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-2511-0075
SAMPLING BY	: SECOT Co., Ltd.	REGISTRATION NO.	: ๖-239
SAMPLING DATE	: 03/12/2025	SAMPLING TIME	: 03.00-04.05 p.m.
RECEIVED DATE	: 06/12/2025	ANALYTICAL DATE	: 15/12/2025-12/01/2026
REPORT DATE	: 12/01/2026	SAMPLE CONDITION	: Normal
SOURCE DESCRIPTION	: Combustion	SITE OPERATOR	: Mr. Kittipong Thakoengsuk
FUEL TYPE	: Natural Gas + Refinery Fuel Gas	REGISTRATION NO.	: ๖-239-0024
STACK LOCATION	: CDU Stack (UTM : 734410E, 1405100N)		

STACK DESCRIPTION

Height	: 63.2	m	Flow Rate ⁽¹⁾	: 1,976	Ncu.m/min
Diameter	: 3.0	m	Excess Oxygen	: 5.03	%
Temperature	: 189.75	°C	Moisture Content	: 12.05	%
Gas Velocity	: 8.27	m/s			

PARAMETER	RESULT ⁽¹⁾				EIA ⁽²⁾ / STANDARD ⁽³⁾		EMISSION RATE		REFERENCE METHOD
	ppm		mg/Ncu.m.		ppm	mg/Ncu.m.	g/s		
	5.03%O ₂	7%O ₂	5.03%O ₂	7%O ₂	7%O ₂	7%O ₂	RESULT	EIA ⁽²⁾	
Sulfur Dioxide (SO ₂)	3.10	2.71	8.11	7.09	60/60	157/157	0.267	1.820	US. EPA Method 6C
Oxide of Nitrogen (NO _x)	20.66	18.09	38.87	34.03	25/200	47/376	1.280	2.000	US. EPA Method 7E
Carbon Monoxide (CO)	0.65	0.57	0.74	0.65	100/690	115/790	0.025	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. ⁽¹⁾ At standard pressure of 760 mmHg and temperature of 25 °C, dry basis.

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

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



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The Monitoring Result of Emission Concentration
CDU
Star Petroleum Refining Public Co., Ltd.
December 3, 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	5.22	5.17	20.65	20.62	18.22
2	5.06	5.02	20.74	20.71	18.13
3	4.94	4.90	20.68	20.64	17.93
Average	5.08	5.03	20.69	20.66	18.09

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	5.22	5.17	2.91	2.86	2.53
2	5.06	5.02	3.31	3.27	2.86
3	4.94	4.90	3.20	3.16	2.75
Average	5.08	5.03	3.14	3.10	2.71

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	5.22	5.17	0.49	0.46	0.41
2	5.06	5.02	1.04	1.00	0.88
3	4.94	4.90	0.56	0.50	0.43
Average	5.08	5.03	0.70	0.65	0.57



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Star Petroleum Refining Public Co., Ltd. Emission Test Result

Run # : 1

Date: 3 December 2025

Location : CDU

Start time: 3:00 PM

Finish time : 3:20 PM

O₂ instrument Model: AMI 70

Serial No.: 161212-14

NO_x instrument Model: TELEDYNE 200 EM

Serial No.: 433

SO₂ instrument Model: API 100 AH

Serial No.: 118

CO instrument Model: THERMO 48 C

Serial No.: 0412106049

Fuel Type : Natural Gas

Test Operator : Song H.

Time, min	O ₂ (%)	NO _x (ppm)	SO ₂ (ppm)	CO (ppm)
3:00 PM	5.18	19.25	3.24	0.57
3:01 PM	5.21	20.17	3.15	0.54
3:02 PM	5.20	20.34	3.31	0.35
3:03 PM	5.25	20.68	3.04	0.91
3:04 PM	5.23	20.85	3.51	0.66
3:05 PM	5.25	20.78	3.11	0.64
3:06 PM	5.25	20.66	2.90	0.36
3:07 PM	5.28	20.61	2.77	0.56
3:08 PM	5.30	20.69	2.80	0.57
3:09 PM	5.29	20.79	2.79	0.33
3:10 PM	5.25	20.63	2.69	0.31
3:11 PM	5.22	20.61	2.67	0.37
3:12 PM	5.16	20.62	2.57	0.32
3:13 PM	5.19	20.71	2.63	0.53
3:14 PM	5.21	20.84	2.73	0.31
3:15 PM	5.22	21.01	2.74	0.66
3:16 PM	5.27	21.02	2.75	0.37
3:17 PM	5.23	20.89	2.89	0.70
3:18 PM	5.24	20.91	2.89	0.41
3:19 PM	5.17	20.91	2.98	0.50
3:20 PM	5.10	20.62	2.95	0.34
Average	5.22	20.65	2.91	0.49

Signature

Miss Katesarin Vorradetwittaya

Environmental Scientist



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Star Petroleum Refining Public Co., Ltd. Emission Test Result

Run # : 2

Date: 3 December 2025

Location : CDU

Start time: 3:21 PM

Finish time : 3:41 PM

O₂ instrument Model: AMI 70

Serial No.: 161212-14

NO_x instrument Model: TELEDYNE 200 EM

Serial No.: 433

SO₂ instrument Model: API 100 AH

Serial No.: 118

CO instrument Model: THERMO 48 C

Serial No.: 0412106049

Fuel Type : Natural Gas

Test Operator : Song H.

Time, min	O ₂ (%)	NO _x (ppm)	SO ₂ (ppm)	CO (ppm)
3:21 PM	5.09	20.46	3.12	0.51
3:22 PM	5.13	20.61	3.13	0.49
3:23 PM	5.17	20.79	3.28	1.97
3:24 PM	5.11	20.85	3.25	0.98
3:25 PM	5.12	20.69	3.25	0.63
3:26 PM	5.07	20.62	3.27	1.71
3:27 PM	5.06	20.79	3.40	1.88
3:28 PM	5.05	20.72	3.45	1.13
3:29 PM	5.00	20.46	3.41	1.13
3:30 PM	5.02	20.52	3.45	0.70
3:31 PM	5.01	20.78	3.38	2.53
3:32 PM	4.99	20.91	3.35	0.95
3:33 PM	4.99	20.98	3.31	1.45
3:34 PM	5.00	20.92	3.35	1.04
3:35 PM	5.00	20.84	3.34	0.29
3:36 PM	5.05	20.75	3.44	0.29
3:37 PM	5.06	20.59	3.50	0.63
3:38 PM	5.06	20.52	3.53	1.07
3:39 PM	5.07	20.74	3.13	0.92
3:40 PM	5.14	21.00	3.09	0.16
3:41 PM	5.09	20.91	3.03	1.41
Average	5.06	20.74	3.31	1.04

Signature

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Star Petroleum Refining Public Co., Ltd. Emission Test Result

Run # : 3

Date: 3 December 2025

Location : CDU

Start time: 3:42 PM

Finish time : 4:02 PM

O₂ instrument Model: AMI 70

Serial No.: 161212-14

NO_x instrument Model: TELEDYNE 200 EM

Serial No.: 433

SO₂ instrument Model: API 100 AH

Serial No.: 118

CO instrument Model: THERMO 48 C

Serial No.: 0412106049

Fuel Type : Natural Gas

Test Operator : Song H.

Time, min	O ₂ (%)	NO _x (ppm)	SO ₂ (ppm)	CO (ppm)
3:42 PM	5.06	20.73	3.13	1.08
3:43 PM	5.02	20.56	3.13	0.65
3:44 PM	5.02	20.56	3.13	0.45
3:45 PM	4.97	20.68	3.11	0.47
3:46 PM	4.97	20.55	3.12	0.40
3:47 PM	4.89	20.42	3.06	0.32
3:48 PM	4.91	20.33	3.21	0.48
3:49 PM	4.96	20.38	3.22	0.32
3:50 PM	4.95	20.61	3.16	0.48
3:51 PM	4.99	20.72	3.19	0.64
3:52 PM	5.02	20.56	3.02	0.48
3:53 PM	4.93	20.61	2.59	0.53
3:54 PM	4.97	20.72	2.92	1.47
3:55 PM	4.96	20.66	3.13	0.98
3:56 PM	4.95	20.64	3.22	0.28
3:57 PM	4.96	20.80	3.25	0.39
3:58 PM	4.93	21.02	3.38	0.22
3:59 PM	4.90	21.04	3.56	0.47
4:00 PM	4.86	20.96	3.60	0.42
4:01 PM	4.79	20.82	3.54	0.89
4:02 PM	4.78	20.92	3.54	0.30
Average	4.94	20.68	3.20	0.56

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-2511-0075
SAMPLING BY	: SECOT Co., Ltd.	REGISTRATION NO.	: ๓-239
SAMPLING DATE	: 25/11/2025	SAMPLING TIME	: 10.00-11.20 a.m
RECEIVED DATE	: 01/12/2025	ANALYTICAL DATE	: 02-04/12/2025
REPORT DATE	: 09/12/2025	SAMPLE CONDITION	: Normal
SOURCE DESCRIPTION	: Combustion	SITE OPERATOR	: Mr. Kittipong Thakoengsuk
FUEL TYPE	: Natural Gas + Refinery Fuel Gas	REGISTRATION NO.	: ๓-239-0024
STACK LOCATION	: VDU Stack (UTM : 734360E, 1405125N)		

STACK DESCRIPTION

Height	: 54	m	Flow Rate ⁽¹⁾	: 1,283	Ncu.m/min
Diameter	: 2.0	m	Excess Oxygen	: 3.86	%
Temperature	: 187.92	°C	Moisture Content	: 11.18	%
Gas Velocity	: 11.89	m/s			

PARAMETER	RESULTS ⁽¹⁾		EIA ⁽²⁾ / STANDARD ⁽³⁾	EMISSION RATE		REFERENCE METHOD
	mg/Ncu.m		mg/Ncu.m	g/s		
	3.86%O ₂	7%O ₂	7%O ₂	RESULT	EIA ⁽²⁾	
Particulate Matter (PM)	1.86	1.52	60/60	0.040	0.200	US. EPA Method 5

(Miss Pornnapa Budthum)

Analyst

REG.NO.๓-239-๓-0018

(Miss Narisa Poowasanpetch)

Technical Management Team

REG.NO.๓-239-๓-0010

- Remark :**
1. Reported analysis refers to submitted sample only.
 2. This report shall not be reproduced, except in full, without official approval.
 3. ⁽¹⁾ At standard pressure of 760 mmHg and temperature of 25 °C, dry basis.
 4. ⁽²⁾ Assigned value in EIA Report Expasion 3 of Refinery Plant, B.E. 2561 (2018).
 5. ⁽³⁾ 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-2511-0075
SAMPLING BY	: SECOT Co., Ltd.	REGISTRATION NO.	: ๓-239
SAMPLING DATE	: 25/11/2025	SAMPLING TIME	: 10.00-11.20 a.m.
RECEIVED DATE	: 06/12/2025	ANALYTICAL DATE	: 15/12/2025-12/01/2026
REPORT DATE	: 12/01/2026	SAMPLE CONDITION	: Normal
SOURCE DESCRIPTION	: Combustion	SITE OPERATOR	: Mr. Kittipong Thakoengsuk
FUEL TYPE	: Natural Gas + Refinery Fuel Gas	REGISTRATION NO.	: ๓-239-0024
STACK LOCATION	: VDU Stack (UTM : 734360E, 1405125N)		

STACK DESCRIPTION

Height	: 54	m	Flow Rate ⁽¹⁾	: 1,283	Ncu.m/min
Diameter	: 2.0	m	Excess Oxygen	: 3.86	%
Temperature	: 187.92	°C	Moisture Content	: 11.18	%
Gas Velocity	: 11.89	m/s			

PARAMETER	RESULT ⁽¹⁾				EIA ⁽²⁾ / STANDARD ⁽³⁾		EMISSION RATE		REFERENCE METHOD
	ppm		mg/Ncu.m.		ppm	mg/Ncu.m.	g/s		
	3.86%O ₂	7%O ₂	3.86%O ₂	7%O ₂	7%O ₂	7%O ₂	RESULT	EIA ⁽²⁾	
Sulfur Dioxide (SO ₂)	3.08	2.51	8.06	6.57	60/60	157/157	0.172	1.510	US. EPA Method 6C
Oxide of Nitrogen (NO _x)	18.04	14.72	33.94	27.69	25/200	47/376	0.726	0.900	US. EPA Method 7E
Carbon Monoxide (CO)	1.26	1.03	1.44	1.18	100/690	115/790	0.031	0.500	US. EPA Method 10

(Miss Katesarin Vorradetwittaya)

Environmental Scientist

REG.NO. ๓-239-๓-0006

(Miss Preeda Somjai)

Technical Management Team

REG.NO. ๓-239-๓-0006

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

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

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

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



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The Monitoring Result of Emission Concentration
VDU
Star Petroleum Refining Public Co., Ltd.
November 25, 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	4.16	4.01	18.02	17.99	14.81
2	3.95	3.82	18.05	18.02	14.66
3	3.87	3.75	18.14	18.12	14.69
Average	3.99	3.86	18.07	18.04	14.72

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	4.16	4.01	3.02	2.97	2.44
2	3.95	3.82	3.12	3.07	2.50
3	3.87	3.75	3.23	3.19	2.59
Average	3.99	3.86	3.12	3.08	2.51

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	4.16	4.01	1.27	1.23	1.01
2	3.95	3.82	1.32	1.28	1.04
3	3.87	3.75	1.31	1.28	1.04
Average	3.99	3.86	1.30	1.26	1.03



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Star Petroleum Refining Public Co., Ltd. Emission Test Result

Date:	25 November 2025	Run # :	1
Start time:	10:15 AM	Location :	VDU
O₂ instrument Model:	AMI 70	Finish time :	10:35 AM
NO_x instrument Model:	TELEDYNE 200 EM	Serial No.:	161212-13
SO₂ instrument Model:	TELEDYNE 100 EH	Serial No.:	433
CO instrument Model:	API 300 A	Serial No.:	186
Fuel Type :	Natural Gas	Serial No.:	1070
		Test Operator :	Pisanu S.

Time, min	O ₂ (%)	NO _x (ppm)	SO ₂ (ppm)	CO (ppm)
10:15 AM	4.39	17.18	1.99	0.78
10:16 AM	4.40	17.47	2.25	0.95
10:17 AM	4.37	17.74	2.57	1.16
10:18 AM	4.27	17.84	2.82	1.23
10:19 AM	4.26	17.95	2.99	1.33
10:20 AM	4.25	17.97	3.08	1.33
10:21 AM	4.24	18.00	3.11	1.33
10:22 AM	4.20	18.06	3.16	1.33
10:23 AM	4.14	18.09	3.12	1.33
10:24 AM	4.14	18.14	3.16	1.33
10:25 AM	4.11	18.13	3.20	1.33
10:26 AM	4.15	18.12	3.15	1.33
10:27 AM	4.13	18.19	3.18	1.33
10:28 AM	4.11	18.17	3.19	1.33
10:29 AM	4.04	18.16	3.17	1.33
10:30 AM	4.00	18.22	3.22	1.33
10:31 AM	3.97	18.23	3.24	1.33
10:32 AM	4.02	18.21	3.25	1.33
10:33 AM	4.03	18.20	3.20	1.32
10:34 AM	4.05	18.19	3.23	1.32
10:35 AM	4.05	18.23	3.08	1.32
Average	4.16	18.02	3.02	1.27

Signature

Miss Katesarin Vorradetwittaya
Environmental Scientist



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Star Petroleum Refining Public Co., Ltd. Emission Test Result

Run # : 2

Date: 25 November 2025

Location : VDU

Start time: 10:36 AM

Finish time : 10:56 AM

O₂ instrument Model: AMI 70

Serial No.: 161212-13

NO_x instrument Model: TELEDYNE 200 EM

Serial No.: 433

SO₂ instrument Model: TELEDYNE 100 EH

Serial No.: 186

CO instrument Model: API 300 A

Serial No.: 1070

Fuel Type : Natural Gas

Test Operator : Pisanu S.

Time, min	O ₂ (%)	NO _x (ppm)	SO ₂ (ppm)	CO (ppm)
10:36 AM	4.04	18.20	2.98	1.32
10:37 AM	4.00	18.18	2.99	1.32
10:38 AM	3.99	18.20	3.06	1.32
10:39 AM	3.99	18.19	3.08	1.32
10:40 AM	3.94	18.09	3.08	1.32
10:41 AM	3.89	18.03	3.07	1.32
10:42 AM	3.86	17.95	3.05	1.32
10:43 AM	3.88	17.94	3.14	1.32
10:44 AM	3.91	17.88	3.11	1.32
10:45 AM	3.95	17.87	3.14	1.32
10:46 AM	3.96	17.94	3.19	1.32
10:47 AM	3.93	17.98	3.18	1.32
10:48 AM	3.92	17.99	3.18	1.32
10:49 AM	3.96	17.96	3.19	1.32
10:50 AM	4.00	18.05	3.13	1.32
10:51 AM	4.00	18.09	3.17	1.32
10:52 AM	3.99	18.14	3.19	1.32
10:53 AM	3.95	18.12	3.14	1.32
10:54 AM	3.94	18.13	3.18	1.32
10:55 AM	3.92	18.09	3.20	1.32
10:56 AM	3.91	18.13	3.16	1.32
Average	3.95	18.05	3.12	1.32

Signature

Miss Katesarin Vorradetwittaya

Environmental Scientist



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Star Petroleum Refining Public Co., Ltd. Emission Test Result

Run # : 3

Date: 25 November 2025

Location : VDU

Start time: 10:57 AM

Finish time : 11:17 AM

O₂ instrument Model: AMI 70

Serial No.: 161212-13

NO_x instrument Model: TELEDYNE 200 EM

Serial No.: 433

SO₂ instrument Model: TELEDYNE 100 EH

Serial No.: 186

CO instrument Model: API 300 A

Serial No.: 1070

Fuel Type : Natural Gas

Test Operator : Pisanu S.

Time, min	O ₂ (%)	NO _x (ppm)	SO ₂ (ppm)	CO (ppm)
10:57 AM	3.94	18.17	3.19	1.32
10:58 AM	3.97	18.16	3.19	1.32
10:59 AM	3.93	18.22	3.16	1.32
11:00 AM	3.91	18.24	3.16	1.31
11:01 AM	3.92	18.18	3.19	1.31
11:02 AM	3.96	18.14	3.20	1.31
11:03 AM	3.95	18.13	3.18	1.31
11:04 AM	3.93	18.11	3.21	1.31
11:05 AM	3.90	18.17	3.23	1.31
11:06 AM	3.84	18.13	3.25	1.31
11:07 AM	3.85	18.10	3.29	1.31
11:08 AM	3.84	18.06	3.29	1.31
11:09 AM	3.84	18.08	3.29	1.31
11:10 AM	3.86	18.10	3.29	1.31
11:11 AM	3.81	18.19	3.26	1.31
11:12 AM	3.83	18.11	3.23	1.31
11:13 AM	3.85	18.11	3.24	1.31
11:14 AM	3.81	18.18	3.30	1.31
11:15 AM	3.79	18.18	3.26	1.31
11:16 AM	3.78	18.14	3.24	1.31
11:17 AM	3.74	18.12	3.23	1.31
Average	3.87	18.14	3.23	1.31

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-2511-0075
SAMPLING BY	: SECOT Co., Ltd.	REGISTRATION NO.	: ๓-239
SAMPLING DATE	: 26/11/2025	SAMPLING TIME	: 10.00-11.25 a.m.
RECEIVED DATE	: 01/12/2025	ANALYTICAL DATE	: 02-04/12/2025
REPORT DATE	: 09/12/2025	SAMPLE CONDITION	: Normal
SOURCE DESCRIPTION	: Combustion	SITE OPERATOR	: Mr. Kittipong Thakoengsuk
FUEL TYPE	: Natural Gas + Refinery Fuel Gas	REGISTRATION NO.	: ๓-239-0024
STACK LOCATION	: NHTU/CCRU (UTM : 734255E, 1405185N)		

STACK DESCRIPTION

Height	: 65	m	Flow Rate ⁽¹⁾	: 2,162	Ncu.m/min
Diameter	: 3.1	m	Excess Oxygen	: 3.95	%
Temperature	: 208.58	°C	Moisture Content	: 10.71	%
Gas Velocity	: 8.65	m/s			

PARAMETER	RESULTS ⁽¹⁾		EIA ⁽²⁾ / STANDARD ⁽³⁾	EMISSION RATE		REFERENCE METHOD
	mg/Ncu.m		mg/Ncu.m	g/s		
	3.95%O ₂	7%O ₂	7%O ₂	RESULT	EIA ⁽²⁾	
Particulate Matter (PM)	2.74	2.25	60/60	0.099	0.380	US. EPA Method 5

(Miss Pornnapa Budthum)

Analyst

REG.NO. ๓-239-๑-0018

(Miss Narisa Poowasanpetch)

Technical Management Team

REG.NO. ๓-239-๓-0010

- Remark :**
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 3. ⁽¹⁾ At standard pressure of 760 mmHg and temperature of 25 °C, dry basis.
 4. ⁽²⁾ Assigned value in EIA Report Expasion 3 of Refinery Plant, B.E. 2561 (2018).
 5. ⁽³⁾ 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-2511-0075
SAMPLING BY	: SECOT Co., Ltd.	REGISTRATION NO.	: ๓-239
SAMPLING DATE	: 26/11/2025	SAMPLING TIME	: 10.00-11.25 a.m.
RECEIVED DATE	: 06/12/2025	ANALYTICAL DATE	: 15/12/2025-12/01/2026
REPORT DATE	: 12/01/2026	SAMPLE CONDITION	: Normal
SOURCE DESCRIPTION	: Combustion	SITE OPERATOR	: Mr. Kittipong Thakoengsuk
FUEL TYPE	: Natural Gas + Refinery Fuel Gas	REGISTRATION NO.	: ๓-239-0024
STACK LOCATION	: NHTU/CCRU (UTM : 734255E, 1405185N)		

STACK DESCRIPTION

Height	: 65	m	Flow Rate ⁽¹⁾	: 2,162	Ncu.m/min
Diameter	: 3.1	m	Excess Oxygen	: 3.95	%
Temperature	: 208.58	°C	Moisture Content	: 10.71	%
Gas Velocity	: 8.65	m/s			

PARAMETER	RESULT ⁽¹⁾				EIA ⁽²⁾ / STANDARD ⁽³⁾		EMISSION RATE		REFERENCE METHOD
	ppm		mg/Ncu.m.		ppm	mg/Ncu.m.	g/s		
	3.95%O ₂	7%O ₂	3.95%O ₂	7%O ₂	7%O ₂	7%O ₂	RESULT	EIA ⁽²⁾	
Sulfur Dioxide (SO ₂)	1.96	1.61	5.13	4.21	60/60	157/157	0.185	1.500	US. EPA Method 6C
Oxide of Nitrogen (NO _x)	40.72	33.39	76.61	62.82	120/200	226/376	2.761	2.830	US. EPA Method 7E
Carbon Monoxide (CO)	1.23	1.01	1.41	1.16	100/690	115/790	0.051	0.100	US. EPA Method 10

(Miss Katesarin Vorradetwittaya)

Environmental Scientist

REG.NO. ๓-239-๓-0006

(Miss Preeda Somjai)

Technical Management Team

REG.NO. ๓-239-๓-0006

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



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The Monitoring Result of Emission Concentration
NHTU/CCRU
Star Petroleum Refining Public Co., Ltd.
November 26, 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	4.06	3.98	40.46	40.46	33.24
2	3.98	3.91	40.70	40.70	33.30
3	4.02	3.96	40.99	40.99	33.63
Average	4.02	3.95	40.72	40.72	33.39

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	4.06	3.98	2.14	2.09	1.72
2	3.98	3.91	2.04	1.99	1.63
3	4.02	3.96	1.86	1.81	1.49
Average	4.02	3.95	2.01	1.96	1.61

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	4.06	3.98	1.25	1.20	0.99
2	3.98	3.91	1.31	1.25	1.02
3	4.02	3.96	1.31	1.24	1.02
Average	4.02	3.95	1.29	1.23	1.01



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Star Petroleum Refining Public Co., Ltd. Emission Test Result

Run # : 1

Date: 26 November 2025

Location : NHTU/CCRU

Start time: 10:20 AM

Finish time : 10:40 AM

O₂ instrument Model: AMI 70

Serial No.: 071023-47

NO_x instrument Model: TELEDYNE 200 EM

Serial No.: 435

SO₂ instrument Model: TELEDYNE 100 EH

Serial No.: 186

CO instrument Model: API 300 A

Serial No.: 1070

Fuel Type : Natural Gas

Test Operator : Song H.

Time, min	O ₂ (%)	NO _x (ppm)	SO ₂ (ppm)	CO (ppm)
10:20 AM	4.11	40.19	2.03	1.21
10:21 AM	4.07	40.28	2.06	1.21
10:22 AM	4.02	40.39	2.08	1.21
10:23 AM	4.12	40.30	2.11	1.21
10:24 AM	4.18	40.29	2.11	1.21
10:25 AM	4.13	40.43	2.07	1.21
10:26 AM	4.10	40.39	2.11	1.21
10:27 AM	4.12	40.32	2.15	1.21
10:28 AM	4.09	40.39	2.20	1.21
10:29 AM	4.01	40.46	2.15	1.21
10:30 AM	4.03	40.43	2.16	1.21
10:31 AM	4.01	40.44	2.15	1.26
10:32 AM	4.10	40.45	2.07	1.32
10:33 AM	4.02	40.44	2.17	1.26
10:34 AM	4.07	40.52	2.21	1.30
10:35 AM	3.97	40.57	2.18	1.32
10:36 AM	3.98	40.66	2.22	1.32
10:37 AM	4.08	40.77	2.21	1.31
10:38 AM	3.98	40.73	2.19	1.25
10:39 AM	3.99	40.65	2.18	1.30
10:40 AM	3.98	40.57	2.18	1.30
Average	4.06	40.46	2.14	1.25

Signature

Miss Katesarin Vorradetwittaya

Environmental Scientist

**SECOT CO.,LTD.**

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Star Petroleum Refining Public Co., Ltd.

Emission Test Result

Run # : 2**Date:** 26 November 2025**Location :** NHTU/CCRU**Start time:** 10:41 AM**Finish time :** 11:01 AM**O₂ instrument Model:** AMI 70**Serial No.:** 071023-47**NO_x instrument Model:** TELEDYNE 200 EM**Serial No.:** 435**SO₂ instrument Model:** TELEDYNE 100 EH**Serial No.:** 186**CO instrument Model:** API 300 A**Serial No.:** 1070**Fuel Type :** Natural Gas**Test Operator :** Song H.

Time, min	O ₂ (%)	NO _x (ppm)	SO ₂ (ppm)	CO (ppm)
10:41 AM	4.02	40.59	2.17	1.32
10:42 AM	4.02	40.68	2.24	1.32
10:43 AM	3.92	40.71	2.27	1.29
10:44 AM	4.00	40.73	2.30	1.32
10:45 AM	3.93	40.72	2.30	1.32
10:46 AM	3.88	40.65	2.30	1.32
10:47 AM	3.88	40.60	2.27	1.32
10:48 AM	3.92	40.59	2.24	1.31
10:49 AM	3.98	40.72	1.82	1.31
10:50 AM	3.95	40.79	1.84	1.31
10:51 AM	3.99	40.85	1.83	1.31
10:52 AM	4.02	40.81	1.81	1.31
10:53 AM	3.96	40.71	1.99	1.31
10:54 AM	4.07	40.92	1.98	1.31
10:55 AM	4.04	40.95	1.94	1.31
10:56 AM	4.01	40.73	1.93	1.31
10:57 AM	3.92	40.55	1.90	1.31
10:58 AM	4.01	40.41	1.98	1.31
10:59 AM	4.10	40.44	1.93	1.31
11:00 AM	4.05	40.67	1.91	1.31
11:01 AM	3.92	40.81	1.84	1.31
Average	3.98	40.70	2.04	1.31

Signature

Miss Katesarin Vorradetwittaya**Environmental Scientist**



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Star Petroleum Refining Public Co., Ltd. Emission Test Result

Run # : 3

Date: 26 November 2025

Location : NHTU/CCRU

Start time: 11:02 AM

Finish time : 11:22 AM

O₂ instrument Model: AMI 70

Serial No.: 071023-47

NO_x instrument Model: TELEDYNE 200 EM

Serial No.: 435

SO₂ instrument Model: TELEDYNE 100 EH

Serial No.: 186

CO instrument Model: API 300 A

Serial No.: 1070

Fuel Type : Natural Gas

Test Operator : Song H.

Time, min	O ₂ (%)	NO _x (ppm)	SO ₂ (ppm)	CO (ppm)
11:02 AM	3.93	40.72	1.85	1.31
11:03 AM	3.96	40.60	1.84	1.31
11:04 AM	3.95	40.50	1.84	1.31
11:05 AM	3.90	40.54	1.83	1.31
11:06 AM	3.96	40.60	1.82	1.31
11:07 AM	3.91	40.57	1.84	1.31
11:08 AM	3.99	40.66	1.87	1.31
11:09 AM	4.11	40.91	1.88	1.31
11:10 AM	4.16	40.99	1.85	1.31
11:11 AM	4.01	41.11	1.86	1.31
11:12 AM	3.95	41.19	1.88	1.31
11:13 AM	3.93	41.12	1.88	1.31
11:14 AM	4.07	41.18	1.93	1.31
11:15 AM	4.06	41.27	1.87	1.31
11:16 AM	4.17	41.26	1.82	1.31
11:17 AM	4.23	41.22	1.81	1.31
11:18 AM	4.16	41.27	1.81	1.31
11:19 AM	4.04	41.29	1.87	1.31
11:20 AM	3.93	41.33	1.91	1.31
11:21 AM	3.98	41.33	1.90	1.31
11:22 AM	4.04	41.23	1.85	1.31
Average	4.02	40.99	1.86	1.31

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-2511-0075
SAMPLING BY	: SECOT Co., Ltd.	REGISTRATION NO.	: ๓-239
SAMPLING DATE	: 27/11/2025	SAMPLING TIME	: 10.30 a.m. - 12.05 p.m.
RECEIVED DATE	: 01/12/2025	ANALYTICAL DATE	: 02-04/12/2025
REPORT DATE	: 09/12/2025	SAMPLE CONDITION	: Normal
SOURCE DESCRIPTION	: Combustion	SITE OPERATOR	: Mr. Kittipong Thakoengsuk
FUEL TYPE	: Natural Gas + Refinery Fuel Gas	REGISTRATION NO.	: ๓-239-0024
STACK LOCATION	: DHTU Stack (UTM : 734140E, 1405255N)		

STACK DESCRIPTION

Height	: 36.2	m	Flow Rate ⁽¹⁾	: 514.9	Ncu.m/min
Diameter	: 1.6	m	Excess Oxygen	: 6.33	%
Temperature	: 445.17	°C	Moisture Content	: 12.58	%
Gas Velocity	: 11.81	m/s			

PARAMETER	RESULTS ⁽¹⁾		EIA ⁽²⁾ / STANDARD ⁽³⁾	EMISSION RATE		REFERENCE METHOD
	mg/Ncu.m		mg/Ncu.m	g/s		
	6.33%O ₂	7%O ₂	7%O ₂	RESULT	EIA ⁽²⁾	
Particulate Matter (PM)	2.14	2.04	60/60	0.018	0.090	US. EPA Method 5

(Miss Pornnapa Budthum)

Analyst

REG.NO.๓-239-๓-0018

(Miss Narisa Poowasanpetch)

Technical Management Team

REG.NO.๓-239-๓-0010

- Remark :**
1. Reported analysis refers to submitted sample only.
 2. This report shall not be reproduced, except in full, without official approval.
 3. ⁽¹⁾ At standard pressure of 760 mmHg and temperature of 25 °C, dry basis.
 4. ⁽²⁾ Assigned value in EIA Report Expasion 3 of Refinery Plant, B.E. 2561 (2018).
 5. ⁽³⁾ 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-2511-0075
SAMPLING BY	: SECOT Co., Ltd.	REGISTRATION NO.	: ๓-239
SAMPLING DATE	: 27/11/2025	SAMPLING TIME	: 10.30 a.m. - 12.05 p.m.
RECEIVED DATE	: 06/12/2025	ANALYTICAL DATE	: 15/12/2025-12/01/2026
REPORT DATE	: 12/01/2026	SAMPLE CONDITION	: Normal
SOURCE DESCRIPTION	: Combustion	SITE OPERATOR	: Mr. Kittipong Thakoengsuk
FUEL TYPE	: Natural Gas + Refinery Fuel Gas	REGISTRATION NO.	: ๓-239-0024
STACK LOCATION	: DHTU Stack (UTM : 734140E, 1405255N)		

STACK DESCRIPTION

Height	: 36.2	m	Flow Rate ⁽¹⁾	: 514.9	Ncu.m/min
Diameter	: 1.6	m	Excess Oxygen	: 6.33	%
Temperature	: 445.17	°C	Moisture Content	: 12.58	%
Gas Velocity	: 11.81	m/s			

PARAMETER	RESULT ⁽¹⁾				EIA ⁽²⁾ / STANDARD ⁽³⁾		EMISSION RATE		REFERENCE METHOD
	ppm		mg/Ncu.m.		ppm	mg/Ncu.m.	g/s		
	6.33%O ₂	7%O ₂	6.33%O ₂	7%O ₂	7%O ₂	7%O ₂	RESULT	EIA ⁽²⁾	
Sulfur Dioxide (SO ₂)	2.06	1.97	5.39	5.16	60/60	157/157	0.046	1.000	US. EPA Method 6C
Oxide of Nitrogen (NO _x)	48.05	45.84	90.40	86.24	120/200	226/376	0.776	0.920	US. EPA Method 7E
Carbon Monoxide (CO)	1.21	1.15	1.39	1.32	100/690	115/790	0.012	0.100	US. EPA Method 10

(Miss Katesarin Vorradetwittaya)

Environmental Scientist

REG.NO. ๓-239-๓-0006

(Miss Preeda Somjai)

Technical Management Team

REG.NO. ๓-239-๓-0006

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

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

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



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The Monitoring Result of Emission Concentration
DHTU
Star Petroleum Refining Public Co., Ltd.
November 27, 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	6.41	6.33	47.13	47.13	44.96
2	6.44	6.37	48.31	48.32	46.22
3	6.35	6.29	48.68	48.69	46.32
Average	6.40	6.33	48.04	48.05	45.84

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	6.41	6.33	1.99	1.98	1.89
2	6.44	6.37	2.14	2.12	2.03
3	6.35	6.29	2.11	2.08	1.98
Average	6.40	6.33	2.08	2.06	1.97

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	6.41	6.33	1.27	1.21	1.15
2	6.44	6.37	1.26	1.21	1.16
3	6.35	6.29	1.25	1.20	1.14
Average	6.40	6.33	1.26	1.21	1.15



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Star Petroleum Refining Public Co., Ltd. Emission Test Result

Run # : 1

Date: 27 November 2025

Location : DHTU

Start time: 10:30 AM

Finish time : 10:50 AM

O₂ instrument Model: AMI 70

Serial No.: 071023-47

NO_x instrument Model: TELEDYNE 200 EM

Serial No.: 435

SO₂ instrument Model: TELEDYNE 100 EH

Serial No.: 186

CO instrument Model: API 300 A

Serial No.: 1070

Fuel Type : Natural Gas

Test Operator : Song H.

Time, min	O ₂ (%)	NO _x (ppm)	SO ₂ (ppm)	CO (ppm)
10:30 AM	6.40	47.46	1.92	1.29
10:31 AM	6.34	47.82	1.92	1.29
10:32 AM	6.28	47.89	1.80	1.27
10:33 AM	6.44	47.60	2.04	1.27
10:34 AM	6.67	46.79	2.04	1.27
10:35 AM	6.69	46.48	2.04	1.27
10:36 AM	6.43	46.45	2.04	1.27
10:37 AM	6.18	46.56	1.80	1.30
10:38 AM	6.28	46.26	1.92	1.30
10:39 AM	6.59	46.20	2.40	1.28
10:40 AM	6.51	46.95	1.92	1.39
10:41 AM	6.54	47.61	1.92	1.21
10:42 AM	6.45	48.00	1.92	1.24
10:43 AM	6.53	48.14	1.92	1.22
10:44 AM	6.47	47.62	2.04	1.24
10:45 AM	6.31	47.04	1.92	1.25
10:46 AM	6.49	46.95	2.04	1.26
10:47 AM	6.27	46.98	2.04	1.25
10:48 AM	6.19	46.85	2.04	1.25
10:49 AM	6.26	46.91	2.04	1.25
10:50 AM	6.39	47.13	2.04	1.25
Average	6.41	47.13	1.99	1.27

Signature

Miss Katesarin Vorradetwittaya

Environmental Scientist



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Star Petroleum Refining Public Co., Ltd. Emission Test Result

Run # : 2

Date: 27 November 2025

Location : DHTU

Start time: 10:51 AM

Finish time : 11:11 AM

O₂ instrument Model: AMI 70

Serial No.: 071023-47

NO_x instrument Model: TELEDYNE 200 EM

Serial No.: 435

SO₂ instrument Model: TELEDYNE 100 EH

Serial No.: 186

CO instrument Model: API 300 A

Serial No.: 1070

Fuel Type : Natural Gas

Test Operator : Song H.

Time, min	O ₂ (%)	NO _x (ppm)	SO ₂ (ppm)	CO (ppm)
10:51 AM	6.28	47.63	2.04	1.25
10:52 AM	6.31	47.76	2.04	1.26
10:53 AM	6.45	47.45	2.04	1.26
10:54 AM	6.47	47.46	2.04	1.24
10:55 AM	6.53	48.12	2.04	1.25
10:56 AM	6.52	48.76	2.04	1.27
10:57 AM	6.42	48.91	2.04	1.25
10:58 AM	6.28	48.76	2.04	1.26
10:59 AM	6.40	48.01	2.04	1.25
11:00 AM	6.29	47.79	2.04	1.26
11:01 AM	6.34	47.67	2.04	1.27
11:02 AM	6.57	47.62	2.40	1.24
11:03 AM	6.51	48.37	2.28	1.26
11:04 AM	6.42	49.19	2.04	1.27
11:05 AM	6.61	49.05	2.40	1.25
11:06 AM	6.39	49.04	2.04	1.25
11:07 AM	6.44	48.79	2.64	1.25
11:08 AM	6.44	48.57	2.28	1.26
11:09 AM	6.32	48.29	2.40	1.26
11:10 AM	6.66	48.09	2.04	1.25
11:11 AM	6.68	49.10	2.04	1.27
Average	6.44	48.31	2.14	1.26

Signature

Miss Katesarin Vorradetwittaya

Environmental Scientist



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Star Petroleum Refining Public Co., Ltd. Emission Test Result

Run # : 3

Date: 27 November 2025

Location : DHTU

Start time: 11:12 AM

Finish time : 11:32 AM

O₂ instrument Model: AMI 70

Serial No.: 071023-47

NO_x instrument Model: TELEDYNE 200 EM

Serial No.: 435

SO₂ instrument Model: TELEDYNE 100 EH

Serial No.: 186

CO instrument Model: API 300 A

Serial No.: 1070

Fuel Type : Natural Gas

Test Operator : Song H.

Time, min	O ₂ (%)	NO _x (ppm)	SO ₂ (ppm)	CO (ppm)
11:12 AM	6.56	49.38	2.04	1.27
11:13 AM	6.42	48.73	2.40	1.25
11:14 AM	6.19	48.77	2.16	1.26
11:15 AM	6.16	48.18	2.28	1.27
11:16 AM	6.42	47.94	2.04	1.25
11:17 AM	6.24	48.20	2.40	1.24
11:18 AM	6.16	47.78	2.04	1.25
11:19 AM	6.19	47.43	2.16	1.24
11:20 AM	6.35	47.70	2.40	1.26
11:21 AM	6.44	48.37	2.04	1.25
11:22 AM	6.37	49.26	2.16	1.25
11:23 AM	6.30	49.30	2.16	1.25
11:24 AM	6.37	48.31	2.28	1.25
11:25 AM	6.59	48.11	1.92	1.25
11:26 AM	6.61	48.73	2.04	1.26
11:27 AM	6.47	48.96	2.16	1.25
11:28 AM	6.40	49.25	1.92	1.25
11:29 AM	6.45	49.44	1.92	1.25
11:30 AM	6.29	49.48	1.92	1.24
11:31 AM	6.25	49.41	1.92	1.25
11:32 AM	6.10	49.56	1.92	1.26
Average	6.35	48.68	2.11	1.25

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-2511-0075
SAMPLING BY	: SECOT Co., Ltd.	REGISTRATION NO.	: ๓-239
SAMPLING DATE	: 27/11/2025	SAMPLING TIME	: 10.00-11.35 a.m.
RECEIVED DATE	: 01/12/2025	ANALYTICAL DATE	: 02-04/12/2025
REPORT DATE	: 09/12/2025	SAMPLE CONDITION	: Normal
SOURCE DESCRIPTION	: Combustion	SITE OPERATOR	: Mr. Kittipong Thakoengsuk
FUEL TYPE	: Natural Gas + Refinery Fuel Gas	REGISTRATION NO.	: ๓-239-0024
STACK LOCATION	: HVGO-HTU (UTM : 734170E, 1405238N)		
STACK DESCRIPTION			

Height	: 36.2	m	Flow Rate ⁽¹⁾	: 384	Ncu.m/min
Diameter	: 1.6	m	Excess Oxygen	: 5.39	%
Temperature	: 371.33	°C	Moisture Content	: 10.90	%
Gas Velocity	: 7.75	m/s			

PARAMETER	RESULTS ⁽¹⁾		EIA ⁽²⁾ / STANDARD ⁽³⁾	EMISSION RATE		REFERENCE METHOD
	mg/Ncu.m		mg/Ncu.m	g/s		
	5.39%O ₂	7%O ₂	7%O ₂	RESULT	EIA ⁽²⁾	
Particulate Matter (PM)	1.71	1.53	60/60	0.011	0.030	US. EPA Method 5

(Miss Pornnapa Budthum)

Analyst

REG.NO.๓-239-๓-0018

(Miss Narisa Poowasanpetch)

Technical Management Team

REG.NO.๓-239-๓-0010

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



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CLIENT NAME	: Star Petroleum Refining Public Co., Ltd.	REFERENCE NO.	: 225003-CEMS-2511-0075
SAMPLING BY	: SECOT Co., Ltd.	REGISTRATION NO.	: ๓-239
SAMPLING DATE	: 27/11/2025	SAMPLING TIME	: 10.00-11.35 a.m.
RECEIVED DATE	: 06/12/2025	ANALYTICAL DATE	: 15/12/2025-12/01/2026
REPORT DATE	: 12/01/2026	SAMPLE CONDITION	: Normal
SOURCE DESCRIPTION	: Combustion	SITE OPERATOR	: Mr. Kittipong Thakoengsuk
FUEL TYPE	: Natural Gas + Refinery Fuel Gas	REGISTRATION NO.	: ๓-239-0024
STACK LOCATION	: HVGO-HTU (UTM : 734170E, 1405238N)		

STACK DESCRIPTION

Height	: 36.2	m	Flow Rate ⁽¹⁾	: 384.1	Ncu.m/min
Diameter	: 1.6	m	Excess Oxygen	: 5.39	%
Temperature	: 371.33	°C	Moisture Content	: 10.90	%
Gas Velocity	: 7.75	m/s			

PARAMETER	RESULT ⁽¹⁾				EIA ⁽²⁾ / STANDARD ⁽³⁾		EMISSION RATE		REFERENCE METHOD
	ppm		mg/Ncu.m.		ppm	mg/Ncu.m.	g/s		
	5.39%O ₂	7%O ₂	5.39%O ₂	7%O ₂	7%O ₂	7%O ₂	RESULT	EIA ⁽²⁾	
Sulfur Dioxide (SO ₂)	2.85	2.55	7.46	6.67	60/60	157/157	0.048	0.630	US. EPA Method 6C
Oxide of Nitrogen (NO _x)	58.41	52.35	109.89	98.49	120/200	226/376	0.703	0.920	US. EPA Method 7E
Carbon Monoxide (CO)	1.05	0.94	1.20	1.08	100/690	115/790	0.008	0.100	US. EPA Method 10

(Miss Katesarin Vorradetwittaya)

Environmental Scientist

REG.NO. ๓-239-๓-0006

(Miss Preeda Somjai)

Technical Management Team

REG.NO. ๓-239-๓-0006

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

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

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

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

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



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**The Monitoring Result of Emission Concentration
HVGO-HTU
Star Petroleum Refining Public Co., Ltd.
November 27, 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	5.51	5.47	58.05	58.06	52.30
2	5.45	5.40	58.95	58.97	52.88
3	5.36	5.30	58.19	58.21	51.87
Average	5.44	5.39	58.40	58.41	52.35

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	5.51	5.47	2.78	2.74	2.47
2	5.45	5.40	2.98	2.92	2.62
3	5.36	5.30	2.96	2.89	2.58
Average	5.44	5.39	2.91	2.85	2.55

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	5.51	5.47	1.16	1.12	1.01
2	5.45	5.40	1.05	1.01	0.91
3	5.36	5.30	1.08	1.03	0.92
Average	5.44	5.39	1.10	1.05	0.94



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Star Petroleum Refining Public Co., Ltd. Emission Test Result

Run # : 1

Date: 27 November 2025

Location : HVGO-HTU

Start time: 10:30 AM

Finish time : 10:50 AM

O₂ instrument Model: AMI 70

Serial No.: 161212-13

NO_x instrument Model: API 200 AH

Serial No.: 314

SO₂ instrument Model: API 100 AH

Serial No.: 058

CO instrument Model: THERMO 48 C

Serial No.: 78253-388

Fuel Type : Natural Gas

Test Operator : Song H.

Time, min	O ₂ (%)	NO _x (ppm)	SO ₂ (ppm)	CO (ppm)
10:30 AM	5.50	56.36	2.80	1.27
10:31 AM	5.72	56.34	2.97	1.19
10:32 AM	5.55	56.68	2.98	1.25
10:33 AM	5.51	56.68	2.88	1.27
10:34 AM	5.83	54.68	2.70	1.22
10:35 AM	5.69	57.17	2.71	1.18
10:36 AM	5.43	58.06	2.73	1.11
10:37 AM	5.38	58.22	2.70	1.10
10:38 AM	5.38	58.47	2.72	1.16
10:39 AM	5.48	58.60	2.72	1.18
10:40 AM	5.43	58.52	2.84	1.07
10:41 AM	5.44	58.64	2.95	1.22
10:42 AM	5.44	58.80	2.79	0.95
10:43 AM	5.47	58.88	2.87	1.22
10:44 AM	5.50	59.06	2.77	1.22
10:45 AM	5.48	59.08	2.81	1.07
10:46 AM	5.49	59.09	2.64	1.22
10:47 AM	5.49	58.95	2.75	1.06
10:48 AM	5.50	58.93	2.75	1.42
10:49 AM	5.43	59.03	2.63	1.11
10:50 AM	5.47	58.81	2.73	0.96
Average	5.51	58.05	2.78	1.16

Signature

Miss Katesarin Vorradetwittaya

Environmental Scientist



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Star Petroleum Refining Public Co., Ltd. Emission Test Result

Run # : 2

Date: 27 November 2025

Location : HVGO-HTU

Start time: 10:51 AM

Finish time : 11:11 AM

O₂ instrument Model: AMI 70

Serial No.: 161212-13

NO_x instrument Model: API 200 AH

Serial No.: 314

SO₂ instrument Model: API 100 AH

Serial No.: 058

CO instrument Model: THERMO 48 C

Serial No.: 78253-388

Fuel Type : Natural Gas

Test Operator : Song H.

Time, min	O ₂ (%)	NO _x (ppm)	SO ₂ (ppm)	CO (ppm)
10:51 AM	5.42	58.71	2.83	1.22
10:52 AM	5.47	58.80	2.78	1.00
10:53 AM	5.48	58.83	2.75	0.91
10:54 AM	5.44	58.77	2.62	1.03
10:55 AM	5.42	58.89	2.78	1.03
10:56 AM	5.42	59.04	2.89	1.10
10:57 AM	5.46	59.04	3.00	1.01
10:58 AM	5.47	58.95	3.14	1.23
10:59 AM	5.46	59.03	3.21	0.95
11:00 AM	5.47	59.18	3.11	0.98
11:01 AM	5.46	58.98	3.20	0.95
11:02 AM	5.44	58.97	3.31	1.22
11:03 AM	5.46	59.15	3.72	1.24
11:04 AM	5.53	59.07	3.25	1.10
11:05 AM	5.47	58.97	2.86	0.89
11:06 AM	5.42	59.13	3.06	1.01
11:07 AM	5.41	59.15	3.10	0.97
11:08 AM	5.44	58.96	2.49	1.01
11:09 AM	5.45	58.88	2.73	1.07
11:10 AM	5.38	58.87	2.93	1.05
11:11 AM	5.41	58.68	2.78	1.11
Average	5.45	58.95	2.98	1.05

Signature

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Star Petroleum Refining Public Co., Ltd. Emission Test Result

Run # : 3

Date: 27 November 2025

Location : HVGO-HTU

Start time: 11:12 AM

Finish time : 11:32 AM

O₂ instrument Model: AMI 70

Serial No.: 161212-13

NO_x instrument Model: API 200 AH

Serial No.: 314

SO₂ instrument Model: API 100 AH

Serial No.: 058

CO instrument Model: THERMO 48 C

Serial No.: 78253-388

Fuel Type : Natural Gas

Test Operator : Song H.

Time, min	O ₂ (%)	NO _x (ppm)	SO ₂ (ppm)	CO (ppm)
11:12 AM	5.46	58.54	2.84	1.13
11:13 AM	5.42	58.51	2.89	1.15
11:14 AM	5.38	58.33	3.07	1.11
11:15 AM	5.41	58.12	2.64	1.14
11:16 AM	5.41	58.09	2.96	1.13
11:17 AM	5.39	58.33	2.87	1.12
11:18 AM	5.40	58.57	3.08	1.18
11:19 AM	5.43	58.67	3.03	1.22
11:20 AM	5.40	58.63	3.52	1.15
11:21 AM	5.40	58.44	3.58	1.07
11:22 AM	5.40	58.41	3.43	1.10
11:23 AM	5.40	58.43	2.89	1.11
11:24 AM	5.33	58.28	2.84	0.98
11:25 AM	5.27	58.20	2.86	1.01
11:26 AM	5.33	58.11	2.90	1.00
11:27 AM	5.29	57.96	2.98	1.02
11:28 AM	5.36	57.69	2.92	1.07
11:29 AM	5.33	57.69	2.70	1.06
11:30 AM	5.27	57.76	2.76	1.00
11:31 AM	5.26	57.68	2.71	1.00
11:32 AM	5.23	57.53	2.67	1.03
Average	5.36	58.19	2.96	1.08

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-2511-0075
SAMPLING BY	: SECOT Co., Ltd.	REGISTRATION NO.	: 3-239
SAMPLING DATE	: 27/11/2025	SAMPLING TIME	: 02.00-03.15 p.m.
RECEIVED DATE	: 01/12/2025	ANALYTICAL DATE	: 02-04/12/2025
REPORT DATE	: 09/12/2025	SAMPLE CONDITION	: Normal
SOURCE DESCRIPTION	: Combustion	SITE OPERATOR	: Mr. Kittipong Thakoengsuk
FUEL TYPE	: Natural Gas + Refinery Fuel Gas	REGISTRATION NO.	: 3-239-0024
STACK LOCATION	: WCN-HTU (UTM : 734270E, 1405460N)		

STACK DESCRIPTION

Height	: 32.5	m	Flow Rate ⁽¹⁾	: 104.5	Ncu.m/min
Diameter	: 0.86	m	Excess Oxygen	: 8.17	%
Temperature	: 294.33	°C	Moisture Content	: 11.65	%
Gas Velocity	: 6.48	m/s			

PARAMETER	RESULTS ⁽¹⁾		EIA ⁽²⁾ / STANDARD ⁽³⁾	EMISSION RATE		REFERENCE METHOD
	mg/Ncu.m		mg/Ncu.m	g/s		
	8.17%O ₂	7%O ₂	7%O ₂	RESULT	EIA ⁽²⁾	
Particulate Matter (PM)	1.84	2.01	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. ⁽¹⁾ At standard pressure of 760 mmHg and temperature of 25 °C, dry basis.
 4. ⁽²⁾ Assigned value in EIA Report Expasion 3 of Refinery Plant, B.E. 2561 (2018).
 5. ⁽³⁾ 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-2511-0075
SAMPLING BY	: SECOT Co., Ltd.	REGISTRATION NO.	: ๓-239
SAMPLING DATE	: 27/11/2025	SAMPLING TIME	: 02.00-03.15 p.m.
RECEIVED DATE	: 06/12/2025	ANALYTICAL DATE	: 15/12/2025-12/01/2026
REPORT DATE	: 12/01/2026	SAMPLE CONDITION	: Normal
SOURCE DESCRIPTION	: Combustion	SITE OPERATOR	: Mr. Kittipong Thakoengsuk
FUEL TYPE	: Natural Gas + Refinery Fuel Gas	REGISTRATION NO.	: ๓-239-0024
STACK LOCATION	: WCN-HTU (UTM : 734270E, 1405460N)		

STACK DESCRIPTION

Height	: 32.5	m	Flow Rate ⁽¹⁾	: 104.5	Ncu.m/min
Diameter	: 0.86	m	Excess Oxygen	: 8.17	%
Temperature	: 294.33	°C	Moisture Content	: 11.65	%
Gas Velocity	: 6.48	m/s			

PARAMETER	RESULT ⁽¹⁾				EIA ⁽²⁾ / STANDARD ⁽³⁾		EMISSION RATE		REFERENCE METHOD
	ppm		mg/Ncu.m.		ppm	mg/Ncu.m.	g/s		
	8.17%O ₂	7%O ₂	8.17%O ₂	7%O ₂	7%O ₂	7%O ₂	RESULT	EIA ⁽²⁾	
Sulfur Dioxide (SO ₂)	1.84	2.01	4.82	5.26	20/60	52/157	0.008	0.100	US. EPA Method 6C
Oxide of Nitrogen (NO _x)	22.59	24.67	42.50	46.41	30/200	56/376	0.074	0.125	US. EPA Method 7E
Carbon Monoxide (CO)	1.33	1.45	1.52	1.66	690/690	790/790	0.003	2.300	US. EPA Method 10

(Miss Katesarin Vorradetwittaya)

Environmental Scientist

REG.NO. ๓-239-๓-0006

(Miss Preeda Somjai)

Technical Management Team

REG.NO. ๓-239-๓-0006

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

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

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



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The Monitoring Result of Emission Concentration
WCN-HTU
Star Petroleum Refining Public Co., Ltd.
November 27, 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	8.27	8.22	22.76	22.74	24.93
2	8.19	8.13	22.47	22.45	24.44
3	8.23	8.17	22.59	22.57	24.64
Average	8.23	8.17	22.61	22.59	24.67

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	8.27	8.22	1.90	1.86	2.04
2	8.19	8.13	1.91	1.88	2.05
3	8.23	8.17	1.81	1.78	1.94
Average	8.23	8.17	1.87	1.84	2.01

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	8.27	8.22	1.59	1.54	1.69
2	8.19	8.13	1.33	1.28	1.39
3	8.23	8.17	1.21	1.16	1.27
Average	8.23	8.17	1.38	1.33	1.45



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Star Petroleum Refining Public Co., Ltd. Emission Test Result

Run # : 1

Date: 27 November 2025

Location : WCN-HTU

Start time: 2:10 PM

Finish time : 2:30 PM

O₂ instrument Model: AMI 70

Serial No.: 071023-47

NO_x instrument Model: TELEDYNE 200 EM

Serial No.: 435

SO₂ instrument Model: TELEDYNE 100 EH

Serial No.: 186

CO instrument Model: API 300 A

Serial No.: 1070

Fuel Type : Natural Gas

Test Operator : Song H.

Time, min	O ₂ (%)	NO _x (ppm)	SO ₂ (ppm)	CO (ppm)
2:10 PM	8.32	22.46	1.75	1.31
2:11 PM	8.20	22.51	1.49	1.41
2:12 PM	8.29	22.56	1.61	1.20
2:13 PM	8.27	22.51	1.96	1.50
2:14 PM	8.12	22.57	1.97	1.19
2:15 PM	8.23	22.66	1.85	1.15
2:16 PM	8.11	22.57	1.97	1.40
2:17 PM	8.22	22.49	2.37	1.44
2:18 PM	8.22	22.62	1.84	1.67
2:19 PM	8.25	22.84	2.04	2.04
2:20 PM	8.28	22.91	1.95	2.08
2:21 PM	8.26	22.82	2.05	1.98
2:22 PM	8.22	22.71	2.06	1.89
2:23 PM	8.25	22.93	1.98	1.85
2:24 PM	8.32	23.06	1.87	1.67
2:25 PM	8.41	23.02	2.19	1.74
2:26 PM	8.37	22.97	1.81	1.74
2:27 PM	8.36	22.94	1.69	1.67
2:28 PM	8.36	23.01	2.03	1.62
2:29 PM	8.38	22.97	1.78	1.52
2:30 PM	8.27	22.83	1.56	1.39
Average	8.27	22.76	1.90	1.59

Signature

Miss Katesarin Vorradetwittaya

Environmental Scientist



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Star Petroleum Refining Public Co., Ltd. Emission Test Result

Run # : 2

Date: 27 November 2025

Location : WCN-HTU

Start time: 2:31 PM

Finish time: 2:51 PM

O₂ instrument Model: AMI 70

Serial No.: 071023-47

NO_x instrument Model: TELEDYNE 200 EM

Serial No.: 435

SO₂ instrument Model: TELEDYNE 100 EH

Serial No.: 186

CO instrument Model: API 300 A

Serial No.: 1070

Fuel Type : Natural Gas

Test Operator : Song H.

Time, min	O ₂ (%)	NO _x (ppm)	SO ₂ (ppm)	CO (ppm)
2:31 PM	8.23	22.24	1.75	1.39
2:32 PM	8.32	22.03	1.69	1.57
2:33 PM	8.34	21.91	2.18	1.48
2:34 PM	8.27	22.11	1.98	1.52
2:35 PM	8.27	22.31	2.14	1.45
2:36 PM	8.31	22.35	1.88	1.24
2:37 PM	8.08	22.53	1.98	1.05
2:38 PM	8.11	22.65	1.96	1.21
2:39 PM	8.16	22.59	2.07	1.31
2:40 PM	8.19	22.70	1.66	1.43
2:41 PM	8.13	22.66	2.04	1.22
2:42 PM	8.20	22.46	2.01	1.32
2:43 PM	8.17	22.56	1.82	1.37
2:44 PM	8.21	22.70	2.05	1.33
2:45 PM	8.24	22.84	1.76	1.25
2:46 PM	8.17	22.81	1.84	1.33
2:47 PM	8.19	22.43	1.75	1.52
2:48 PM	8.08	22.18	2.04	1.27
2:49 PM	8.08	22.44	1.78	1.31
2:50 PM	8.07	22.74	2.03	1.18
2:51 PM	8.13	22.61	1.64	1.14
Average	8.19	22.47	1.91	1.33

Signature

Miss Katesarin Vorradetwittaya

Environmental Scientist



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Star Petroleum Refining Public Co., Ltd. Emission Test Result

Run # : 3

Date: 27 November 2025

Location : WCN-HTU

Start time: 2:52 PM

Finish time : 3:12 PM

O₂ instrument Model: AMI 70

Serial No.: 071023-47

NO_x instrument Model: TELEDYNE 200 EM

Serial No.: 435

SO₂ instrument Model: TELEDYNE 100 EH

Serial No.: 186

CO instrument Model: API 300 A

Serial No.: 1070

Fuel Type : Natural Gas

Test Operator : Song H.

Time, min	O ₂ (%)	NO _x (ppm)	SO ₂ (ppm)	CO (ppm)
2:52 PM	8.09	22.53	2.01	1.15
2:53 PM	8.13	22.58	1.61	1.08
2:54 PM	8.22	22.58	1.76	1.26
2:55 PM	8.13	22.66	1.83	1.21
2:56 PM	8.19	22.71	1.88	1.16
2:57 PM	8.19	22.76	1.85	1.06
2:58 PM	8.23	22.62	1.52	1.15
2:59 PM	8.31	22.39	1.79	1.38
3:00 PM	8.26	22.39	1.84	1.34
3:01 PM	8.20	22.59	1.70	1.22
3:02 PM	8.29	22.50	1.55	1.16
3:03 PM	8.30	22.48	1.82	1.29
3:04 PM	8.24	22.61	1.92	1.41
3:05 PM	8.18	22.73	1.90	1.44
3:06 PM	8.28	22.77	1.75	1.32
3:07 PM	8.17	22.88	1.79	1.17
3:08 PM	8.26	22.75	1.93	1.12
3:09 PM	8.34	22.52	1.89	1.15
3:10 PM	8.33	22.31	1.69	1.12
3:11 PM	8.20	22.43	1.94	1.04
3:12 PM	8.32	22.62	2.05	1.17
Average	8.23	22.59	1.81	1.21

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-2511-0075
SAMPLING BY	: SECOT Co., Ltd.	REGISTRATION NO.	: 7-239
SAMPLING DATE	: 07/11/2025	SAMPLING TIME	: 10.00-11.35 a.m.
RECEIVED DATE	: 10/11/2025	ANALYTICAL DATE	: 10-11/11/2025
REPORT DATE	: 17/11/2025	SAMPLE CONDITION	: Normal
SOURCE DESCRIPTION	: Combustion	SITE OPERATOR	: Mr. Kittipong Thakoengsuk
FUEL TYPE	: Natural Gas + Refinery Fuel Gas	REGISTRATION NO.	: 7-239-0024
STACK LOCATION	: SRU/TGTU (UTM : 733930E, 1405370N)		

STACK DESCRIPTION

Height	: 70.1	m	Flow Rate ⁽¹⁾	: 331.5	Ncu.m/min
Diameter	: 2.2	m	Excess Oxygen	: 5.36	%
Temperature	: 472.67	°C	Moisture Content	: 15.16	%
Gas Velocity	: 4.32	m/s			

PARAMETER	RESULTS ⁽¹⁾		EIA ⁽²⁾ / STANDARD ⁽³⁾	EMISSION RATE		REFERENCE METHOD
	mg/Ncu.m		mg/Ncu.m	g/s		
	5.36%O ₂	7%O ₂	7%O ₂	RESULT	EIA ⁽²⁾	
Particulate Matter (PM)	2.70	2.42	60/-	0.015	0.040	US. EPA Method 5



(Miss Pornnapa Budthum)

Analyst

REG.NO.7-239-ท-0018



(Miss Narisa Poowasanpetch)

Technical Management Team

REG.NO.7-239-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. ⁽¹⁾ At standard pressure of 760 mmHg and temperature of 25 °C, dry basis.
 4. ⁽²⁾ Assigned value in EIA Report Expasion 3 of Refinery Plant, B.E. 2561 (2018).
 5. ⁽³⁾ 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-2511-0075
SAMPLING BY	: SECOT Co., Ltd.	REGISTRATION NO.	: ๓-239
SAMPLING DATE	: 07/11/2025	SAMPLING TIME	: 10.00-11.35 a.m.
RECEIVED DATE	: 06/12/2025	ANALYTICAL DATE	: 15/12/2025-12/01/2026
REPORT DATE	: 12/01/2026	SAMPLE CONDITION	: Normal
SOURCE DESCRIPTION	: Combustion	SITE OPERATOR	: Mr. Kittipong Thakoengsuk
FUEL TYPE	: Natural Gas + Refinery Fuel Gas	REGISTRATION NO.	: ๓-239-0024
STACK LOCATION	: SRU/TGTU (UTM : 733930E, 1405370N)		

STACK DESCRIPTION

Height	: 70.1	m	Flow Rate ⁽¹⁾	: 331.5	Ncu.m/min
Diameter	: 2.2	m	Excess Oxygen	: 5.36	%
Temperature	: 472.67	°C	Moisture Content	: 15.16	%
Gas Velocity	: 4.32	m/s			

PARAMETER	RESULT ⁽¹⁾				EIA ⁽²⁾ / STANDARD ⁽³⁾		EMISSION RATE		REFERENCE METHOD
	ppm		mg/Ncu.m.		ppm	mg/Ncu.m.	g/s		
	5.36%O ₂	7%O ₂	5.36%O ₂	7%O ₂	7%O ₂	7%O ₂	RESULT	EIA ⁽²⁾	
Sulfur Dioxide (SO ₂)	316.00	282.71	827.16	740.02	500/500	1,309/1,309	4.570	10.000	US. EPA Method 6C
Oxide of Nitrogen (NO _x)	10.89	9.75	20.49	18.34	60/200	113/376	0.113	0.320	US. EPA Method 7E
Carbon Monoxide (CO)	289.39	258.90	331.41	296.49	350/690	401/790	1.831	2.000	US. EPA Method 10

(Miss Katesarin Vorradetwittaya)

Environmental Scientist

REG.NO. ๓-239-๓-0006

(Miss Preeda Somjai)

Technical Management Team

REG.NO. ๓-239-๓-0006

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

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

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

5. ⁽³⁾ 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-2511-0075
SAMPLING BY	: SECOT Co., Ltd.	REGISTRATION NO.	: -
SAMPLING DATE	: 07/11/2025	SAMPLING TIME	: 10.00-11.35 a.m.
RECEIVED DATE	: 10/11/2025	ANALYTICAL DATE	: 10-11/11/2025
REPORT DATE	: 17/11/2025	SAMPLE CONDITION	: Normal
SOURCE DESCRIPTION	: Combustion	SITE OPERATOR	: Mr. Kittipong Thakoengsuk
FUEL TYPE	: Natural Gas + Refinery Fuel Gas	REGISTRATION NO.	: -
STACK LOCATION	: SRU/TGTU (UTM : 733930E, 1405370N)		

STACK DESCRIPTION

Height	: 70.1	m	Flow Rate ⁽¹⁾	: 331.5	Ncu.m/min
Diameter	: 2.2	m	Excess Oxygen	: 5.36	%
Temperature	: 472.67	°C	Moisture Content	: 15.16	%
Gas Velocity	: 4.32	m/s			

PARAMETER	RESULT ⁽¹⁾				EIA ⁽²⁾ / STANDARD		EMISSION RATE		REFERENCE METHOD
	ppm		mg/Ncu.m.		ppm	mg/Ncu.m.	g/s		
	5.36%O ₂	7%O ₂	5.36%O ₂	7%O ₂			RESULT	EIA ⁽²⁾	
	5.36%O ₂	7%O ₂	5.36%O ₂	7%O ₂	7%O ₂	7%O ₂	RESULT	EIA ⁽²⁾	
Hydrogen Sulfide (H ₂ S)	ND (<0.3)	ND (<0.3)	ND (<0.4)	ND (<0.4)	60/-	83/-	<0.002	0.040	US. EPA Method 16


Sudaporn S.

(Miss Sudaporn Soonthorn)

Analyst


Narisa Poowasanpetch

(Miss Narisa Poowasanpetch)

Technical Management Team

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

4. ⁽²⁾ 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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**The Monitoring Result of Emission Concentration
SRU/TGTU
Star Petroleum Refining Public Co., Ltd.
November 7, 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	5.58	5.42	10.83	10.80	9.70
2	5.51	5.36	10.98	10.95	9.79
3	5.46	5.31	10.95	10.93	9.75
Average	5.52	5.36	10.92	10.89	9.75

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	5.58	5.42	306.73	307.05	275.71
2	5.51	5.36	318.66	318.98	285.32
3	5.46	5.31	321.69	321.98	287.08
Average	5.52	5.36	315.69	316.00	282.71

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	5.58	5.42	296.95	297.19	266.86
2	5.51	5.36	286.98	287.21	256.90
3	5.46	5.31	283.53	283.76	253.00
Average	5.52	5.36	289.15	289.39	258.90



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Star Petroleum Refining Public Co., Ltd. Emission Test Result

Run # : 1

Date: 7 November 2025

Location : SRU/TGTU

Start time: 10:30 AM

Finish time : 10:50 AM

O₂ instrument Model: AMI 70

Serial No.: 121121-10

NO_x instrument Model: API 200 AH

Serial No.: 441

SO₂ instrument Model: API 100 AH

Serial No.: 060

CO instrument Model: THERMO 48 C

Serial No.: 70162-362

Fuel Type : Natural Gas

Test Operator : Pisanu S.

Time, min	O ₂ (%)	NO _x (ppm)	SO ₂ (ppm)	CO (ppm)
10:30 AM	5.91	10.26	280.57	295.77
10:31 AM	5.67	10.27	284.77	293.29
10:32 AM	5.25	10.31	295.30	291.50
10:33 AM	5.69	10.37	297.94	290.49
10:34 AM	5.71	10.54	302.03	291.19
10:35 AM	5.63	10.67	304.62	293.10
10:36 AM	5.62	10.71	306.00	295.55
10:37 AM	5.63	10.82	306.14	298.04
10:38 AM	5.70	10.87	306.08	298.56
10:39 AM	5.66	10.92	306.20	297.06
10:40 AM	5.67	11.03	308.54	293.52
10:41 AM	5.52	11.09	310.62	291.93
10:42 AM	5.51	11.05	313.70	292.12
10:43 AM	5.61	11.06	312.98	294.28
10:44 AM	5.45	11.05	313.92	297.45
10:45 AM	5.45	10.95	314.95	301.36
10:46 AM	5.44	10.94	315.68	304.15
10:47 AM	5.58	11.07	314.54	305.67
10:48 AM	5.49	11.18	315.85	305.33
10:49 AM	5.43	11.14	317.04	303.81
10:50 AM	5.57	11.06	313.94	301.70
Average	5.58	10.83	306.73	296.95

Signature

Miss Katesarin Vorradetwittaya

Environmental Scientist



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Star Petroleum Refining Public Co., Ltd. Emission Test Result

Run # : 2

Date: 7 November 2025

Location : SRU/TGTU

Start time: 10:51 AM

Finish time : 11:11 AM

O₂ instrument Model: AMI 70

Serial No.: 121121-10

NO_x instrument Model: API 200 AH

Serial No.: 441

SO₂ instrument Model: API 100 AH

Serial No.: 060

CO instrument Model: THERMO 48 C

Serial No.: 70162-362

Fuel Type : Natural Gas

Test Operator : Pisanu S.

Time, min	O ₂ (%)	NO _x (ppm)	SO ₂ (ppm)	CO (ppm)
10:51 AM	5.47	11.02	314.82	298.97
10:52 AM	5.49	10.99	315.48	296.65
10:53 AM	5.48	10.98	315.31	293.10
10:54 AM	5.41	10.96	315.90	291.04
10:55 AM	5.44	10.96	317.42	290.94
10:56 AM	5.40	10.95	318.64	291.83
10:57 AM	5.39	10.90	319.96	293.44
10:58 AM	5.52	10.92	316.64	295.11
10:59 AM	5.47	10.97	316.45	293.86
11:00 AM	5.53	11.02	317.95	292.19
11:01 AM	5.47	11.02	318.18	289.54
11:02 AM	5.53	11.03	319.54	286.75
11:03 AM	5.61	11.05	320.49	284.99
11:04 AM	5.53	11.06	319.73	282.61
11:05 AM	5.61	11.09	319.95	279.75
11:06 AM	5.48	11.09	320.35	276.98
11:07 AM	5.49	10.98	322.70	275.75
11:08 AM	5.57	10.84	320.75	276.66
11:09 AM	5.62	10.85	319.92	278.23
11:10 AM	5.55	10.93	319.70	279.43
11:11 AM	5.56	10.95	321.90	278.80
Average	5.51	10.98	318.66	286.98

Signature

Miss Katesarin Vorradetwittaya

Environmental Scientist



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Star Petroleum Refining Public Co., Ltd. Emission Test Result

Run # : 3

Date: 7 November 2025

Location : SRU/TGTU

Start time: 11:12 AM

Finish time : 11:32 AM

O₂ instrument Model: AMI 70

Serial No.: 121121-10

NO_x instrument Model: API 200 AH

Serial No.: 441

SO₂ instrument Model: API 100 AH

Serial No.: 060

CO instrument Model: THERMO 48 C

Serial No.: 70162-362

Fuel Type : Natural Gas

Test Operator : Pisanu S.

Time, min	O ₂ (%)	NO _x (ppm)	SO ₂ (ppm)	CO (ppm)
11:12 AM	5.48	10.91	322.80	278.77
11:13 AM	5.43	10.91	321.99	279.06
11:14 AM	5.55	10.96	320.14	280.72
11:15 AM	5.57	11.02	319.09	281.40
11:16 AM	5.41	11.06	321.95	281.06
11:17 AM	5.46	10.98	321.48	281.40
11:18 AM	5.39	10.98	320.75	280.84
11:19 AM	5.38	11.01	324.99	281.55
11:20 AM	5.36	10.98	328.04	283.11
11:21 AM	5.33	10.99	328.06	285.52
11:22 AM	5.40	10.97	327.35	288.72
11:23 AM	5.43	10.94	326.45	291.57
11:24 AM	5.44	10.99	322.18	292.01
11:25 AM	5.34	10.97	320.18	291.07
11:26 AM	5.63	10.88	317.92	289.84
11:27 AM	5.53	10.88	317.25	286.80
11:28 AM	5.53	10.97	318.83	284.24
11:29 AM	5.52	11.00	319.20	281.48
11:30 AM	5.57	10.98	319.29	279.54
11:31 AM	5.46	10.93	319.23	279.78
11:32 AM	5.45	10.54	318.23	275.72
Average	5.46	10.95	321.69	283.53

Signature

Miss Katesarin Vorradetwittaya

Environmental Scientist



บริษัท ซีคอต จำกัด

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STACK EMISSION ANALYSIS REPORT

CLIENT NAME	: Star Petroleum Refining Public Co., Ltd.	REFERENCE NO.	: 225003-STK-2511-0075
SAMPLING BY	: SECOT Co., Ltd.	REGISTRATION NO.	: ๓-239
SAMPLING DATE	: 27/11/2025	SAMPLING TIME	: 11.00 a.m. - 12.15 p.m.
RECEIVED DATE	: 01/12/2025	ANALYTICAL DATE	: 02-04/12/2025
REPORT DATE	: 09/12/2025	SAMPLE CONDITION	: Normal
SOURCE DESCRIPTION	: Combustion	SITE OPERATOR	: Mr. Kittipong Thakoengsuk
FUEL TYPE	: Natural Gas + Refinery Fuel Gas	REGISTRATION NO.	: ๓-239-0024
STACK LOCATION	: Boiler#2 (UTM : 734412E, 1404952N)		

STACK DESCRIPTION

Height	: 32.4	m	Flow Rate ⁽¹⁾	: 591.4	Ncu.m/min
Diameter	: 1.5	m	Excess Oxygen	: 4.07	%
Temperature	: 165.17	°C	Moisture Content	: 12.63	%
Gas Velocity	: 9.43	m/s			

PARAMETER	RESULTS ⁽¹⁾		EIA ⁽²⁾ / STANDARD ⁽³⁾	EMISSION RATE		REFERENCE METHOD
	mg/Ncu.m		mg/Ncu.m	g/s		
	4.07%O ₂	7%O ₂	7%O ₂	RESULT	EIA ⁽²⁾	
Particulate Matter (PM)	2.17	1.79	60/60	0.021	0.100	US. EPA Method 5



(Miss Pornnapa Budthum)

Analyst

REG.NO.๓-239-๓-0018



(Miss Narisa Poowasanpetch)

Technical Management Team

REG.NO.๓-239-๓-0010

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 3. ⁽¹⁾ At standard pressure of 760 mmHg and temperature of 25 °C, dry basis.
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 5. ⁽³⁾ 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-2511-0075
SAMPLING BY	: SECOT Co., Ltd.	REGISTRATION NO.	: ๓-239
SAMPLING DATE	: 27/11/2025	SAMPLING TIME	: 11.00 a.m. - 12.15 p.m.
RECEIVED DATE	: 06/12/2025	ANALYTICAL DATE	: 15/12/2025-12/01/2026
REPORT DATE	: 12/01/2026	SAMPLE CONDITION	: Normal
SOURCE DESCRIPTION	: Combustion	SITE OPERATOR	: Mr. Kittipong Thakoengsuk
FUEL TYPE	: Natural Gas + Refinery Fuel Gas	REGISTRATION NO.	: ๓-239-0024
STACK LOCATION	: Boiler#2 (UTM : 734412E, 1404952N)		

STACK DESCRIPTION

Height	: 32.4	m	Flow Rate ⁽¹⁾	: 591.4	Ncu.m/min
Diameter	: 1.5	m	Excess Oxygen	: 4.07	%
Temperature	: 165.17	°C	Moisture Content	: 12.63	%
Gas Velocity	: 9.43	m/s			

PARAMETER	RESULT ⁽¹⁾				EIA ⁽²⁾ / STANDARD ⁽³⁾		EMISSION RATE		REFERENCE METHOD
	ppm		mg/Ncu.m.		ppm	mg/Ncu.m.	g/s		
	4.07%O ₂	7%O ₂	4.07%O ₂	7%O ₂	7%O ₂	7%O ₂	RESULT	EIA ⁽²⁾	
Sulfur Dioxide (SO ₂)	0.78	0.64	2.04	1.68	60/60	157/157	0.020	0.500	US. EPA Method 6C
Oxide of Nitrogen (NO _x)	115.99	95.78	218.22	180.20	120/200	226/376	2.151	2.620	US. EPA Method 7E
Carbon Monoxide (CO)	7.65	6.32	8.76	7.24	100/690	115/790	0.086	0.200	US. EPA Method 10

(Miss Katesarin Vorradetwittaya)

Environmental Scientist

REG.NO. ๓-239-๓-0006

(Miss Preeda Somjai)

Technical Management Team

REG.NO. ๓-239-๓-0006

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

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



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The Monitoring Result of Emission Concentration
Boiler 2
Star Petroleum Refining Public Co., Ltd.
November 27, 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	4.16	4.13	115.91	115.97	96.12
2	4.05	4.01	116.60	116.67	96.02
3	4.10	4.06	115.25	115.32	95.19
Average	4.10	4.07	115.92	115.99	95.78

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	4.16	4.13	0.55	0.50	0.41
2	4.05	4.01	0.82	0.77	0.63
3	4.10	4.06	1.12	1.07	0.88
Average	4.10	4.07	0.83	0.78	0.64

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	4.16	4.13	6.70	6.66	5.52
2	4.05	4.01	8.05	8.01	6.59
3	4.10	4.06	8.34	8.29	6.84
Average	4.10	4.07	7.70	7.65	6.32



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Star Petroleum Refining Public Co., Ltd. Emission Test Result

Run # : 1

Date: 27 November 2025

Location : Boiler 2

Start time: 11:10 AM

Finish time : 11:30 AM

O₂ instrument Model: AMI 70

Serial No.: 121121-10

NO_x instrument Model: API 200 AH

Serial No.: 441

SO₂ instrument Model: API 100 AH

Serial No.: 060

CO instrument Model: THERMO 48 C

Serial No.: 365

Fuel Type : Natural Gas

Test Operator : Kittipong T.

Time, min	O ₂ (%)	NO _x (ppm)	SO ₂ (ppm)	CO (ppm)
11:10 AM	4.35	113.21	0.56	8.19
11:11 AM	4.42	113.35	0.63	8.20
11:12 AM	4.36	113.63	0.56	4.70
11:13 AM	4.07	114.45	0.50	4.72
11:14 AM	3.99	115.84	0.56	8.22
11:15 AM	4.20	115.76	0.52	8.23
11:16 AM	4.33	115.18	0.53	2.91
11:17 AM	4.09	115.66	0.54	5.58
11:18 AM	3.98	117.23	0.53	8.25
11:19 AM	4.06	116.97	0.50	7.76
11:20 AM	4.17	116.44	0.49	2.23
11:21 AM	4.16	116.22	0.55	3.10
11:22 AM	4.20	115.90	0.52	7.28
11:23 AM	4.24	115.68	0.55	3.29
11:24 AM	4.25	116.12	0.51	8.28
11:25 AM	4.34	116.26	0.49	8.29
11:26 AM	4.40	116.38	0.58	8.29
11:27 AM	4.29	116.41	0.56	8.30
11:28 AM	3.94	116.72	0.65	8.30
11:29 AM	3.76	118.04	0.66	8.30
11:30 AM	3.77	118.66	0.60	8.31
Average	4.16	115.91	0.55	6.70

Signature

Miss Katesarin Vorradetwittaya

Environmental Scientist



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Star Petroleum Refining Public Co., Ltd. Emission Test Result

Date:	27 November 2025	Run # :	2
Start time:	11:31 AM	Location :	Boiler 2
O₂ instrument Model:	AMI 70	Finish time :	11:51 AM
NO_x instrument Model:	API 200 AH	Serial No.:	121121-10
SO₂ instrument Model:	API 100 AH	Serial No.:	441
CO instrument Model:	THERMO 48 C	Serial No.:	060
Fuel Type :	Natural Gas	Serial No.:	365
		Test Operator :	Kittipong T.

Time, min	O ₂ (%)	NO _x (ppm)	SO ₂ (ppm)	CO (ppm)
11:31 AM	4.24	117.20	0.65	8.31
11:32 AM	4.17	116.49	0.65	8.31
11:33 AM	3.90	117.73	0.66	8.32
11:34 AM	3.85	118.25	0.68	3.49
11:35 AM	4.12	117.20	0.69	7.32
11:36 AM	4.13	116.20	0.75	8.32
11:37 AM	4.21	116.17	0.72	8.32
11:38 AM	4.10	115.94	0.72	8.33
11:39 AM	3.87	116.34	0.76	8.33
11:40 AM	3.87	117.05	0.83	8.33
11:41 AM	4.14	116.56	0.83	8.33
11:42 AM	4.22	116.01	0.77	8.33
11:43 AM	4.17	116.03	0.90	8.33
11:44 AM	4.04	116.29	0.86	8.34
11:45 AM	4.11	116.25	0.87	8.33
11:46 AM	4.10	116.08	0.87	8.34
11:47 AM	4.03	116.34	0.92	8.33
11:48 AM	3.90	116.85	0.98	8.34
11:49 AM	3.96	116.88	0.98	8.33
11:50 AM	3.93	116.61	1.04	8.34
11:51 AM	3.89	116.12	1.04	8.33
Average	4.05	116.60	0.82	8.05

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Star Petroleum Refining Public Co., Ltd. Emission Test Result

Run # : 3

Date: 27 November 2025

Location : Boiler 2

Start time: 11:52 AM

Finish time : 12:12 PM

O₂ instrument Model: AMI 70

Serial No.: 121121-10

NO_x instrument Model: API 200 AH

Serial No.: 441

SO₂ instrument Model: API 100 AH

Serial No.: 060

CO instrument Model: THERMO 48 C

Serial No.: 365

Fuel Type : Natural Gas

Test Operator : Kittipong T.

Time, min	O ₂ (%)	NO _x (ppm)	SO ₂ (ppm)	CO (ppm)
11:52 AM	4.20	115.20	1.07	8.33
11:53 AM	4.22	114.62	1.03	8.34
11:54 AM	3.99	114.95	1.05	8.33
11:55 AM	4.09	115.59	1.11	8.34
11:56 AM	4.18	115.30	1.09	8.33
11:57 AM	4.21	115.13	1.07	8.33
11:58 AM	4.02	115.15	1.14	8.33
11:59 AM	3.95	116.19	1.12	8.33
12:00 PM	3.91	116.27	1.13	8.34
12:01 PM	4.01	116.46	1.12	8.33
12:02 PM	4.06	116.36	1.14	8.33
12:03 PM	3.99	116.56	1.14	8.33
12:04 PM	4.11	116.65	1.09	8.34
12:05 PM	4.17	115.08	1.13	8.34
12:06 PM	4.25	114.12	1.15	8.34
12:07 PM	4.25	114.57	1.10	8.34
12:08 PM	4.00	115.35	1.08	8.35
12:09 PM	3.88	115.12	1.16	8.34
12:10 PM	4.13	114.72	1.18	8.35
12:11 PM	4.23	113.75	1.22	8.35
12:12 PM	4.29	113.18	1.19	8.35
Average	4.10	115.25	1.12	8.34

Signature

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STACK EMISSION ANALYSIS REPORT

CLIENT NAME	: Star Petroleum Refining Public Co., Ltd.	REFERENCE NO.	: 225003-STK-2511-0075
SAMPLING BY	: SECOT Co., Ltd.	REGISTRATION NO.	: ๓-239
SAMPLING DATE	: 27/11/2025	SAMPLING TIME	: 11.10 a.m. - 01.15 p.m.
RECEIVED DATE	: 01/12/2025	ANALYTICAL DATE	: 02-04/12/2025
REPORT DATE	: 09/12/2025	SAMPLE CONDITION	: Normal
SOURCE DESCRIPTION	: Combustion	SITE OPERATOR	: Mr. Kittipong Thakoengsuk
FUEL TYPE	: Natural Gas + Refinery Fuel Gas	REGISTRATION NO.	: ๓-239-0024
STACK LOCATION	: Boiler#3 (UTM : 734400E, 1404932N)		

STACK DESCRIPTION

Height	: 32.4	m	Flow Rate ⁽¹⁾	: 703.9	Ncu.m/min
Diameter	: 1.5	m	Excess Oxygen	: 5.14	%
Temperature	: 155.67	°C	Moisture Content	: 13.42	%
Gas Velocity	: 11.08	m/s			

PARAMETER	RESULTS ⁽¹⁾		EIA ⁽²⁾ / STANDARD ⁽³⁾	EMISSION RATE		REFERENCE METHOD
	mg/Ncu.m		mg/Ncu.m	g/s		
	5.14%O ₂	7%O ₂	7%O ₂	RESULT	EIA ⁽²⁾	
Particulate Matter (PM)	2.00	1.76	20/60	0.023	0.400	US. EPA Method 5

(Miss Pornnapa Budthum)

Analyst

REG.NO.๓-239-๓-0018

(Miss Narisa Poowasanpetch)

Technical Management Team

REG.NO.๓-239-๓-0010

- Remark :**
1. Reported analysis refers to submitted sample only.
 2. This report shall not be reproduced, except in full, without official approval.
 3. ⁽¹⁾ At standard pressure of 760 mmHg and temperature of 25 °C, dry basis.
 4. ⁽²⁾ Assigned value in EIA Report Expasion 3 of Refinery Plant, B.E. 2561 (2018).
 5. ⁽³⁾ 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-2511-0075
SAMPLING BY	: SECOT Co., Ltd.	REGISTRATION NO.	: ๓-239
SAMPLING DATE	: 27/11/2025	SAMPLING TIME	: 11.10 a.m. - 01.15 p.m.
RECEIVED DATE	: 06/12/2025	ANALYTICAL DATE	: 15/12/2025-12/01/2026
REPORT DATE	: 12/01/2026	SAMPLE CONDITION	: Normal
SOURCE DESCRIPTION	: Combustion	SITE OPERATOR	: Mr. Kittipong Thakoengsuk
FUEL TYPE	: Natural Gas + Refinery Fuel Gas	REGISTRATION NO.	: ๓-239-0024
STACK LOCATION	: Boiler#3 (UTM : 734400E, 1404932N)		

STACK DESCRIPTION

Height	: 32.4	m	Flow Rate ⁽¹⁾	: 703.9	Ncu.m/min
Diameter	: 1.5	m	Excess Oxygen	: 5.14	%
Temperature	: 155.67	°C	Moisture Content	: 13.42	%
Gas Velocity	: 11.08	m/s			


PARAMETER	RESULT ⁽¹⁾				EIA ⁽²⁾ / STANDARD ⁽³⁾		EMISSION RATE		REFERENCE METHOD
	ppm		mg/Ncu.m.		ppm	mg/Ncu.m.	g/s		
	5.14%O ₂	7%O ₂	5.14%O ₂	7%O ₂	7%O ₂	7%O ₂	RESULT	EIA ⁽²⁾	
Sulfur Dioxide (SO ₂)	1.03	0.91	2.70	2.38	20/60	52/157	0.032	1.000	US. EPA Method 6C
Oxide of Nitrogen (NO _x)	50.70	44.72	95.39	84.14	55/200	103/376	1.119	2.200	US. EPA Method 7E
Carbon Monoxide (CO)	0.07	0.06	0.08	0.07	8/690	115/790	0.001	0.200	US. EPA Method 10



(Miss Katesarin Vorradetwittaya)

Environmental Scientist

REG.NO. ๓-239-๓-0006



(Miss Preeda Somjai)

Technical Management Team

REG.NO. ๓-239-๓-0006

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

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

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

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



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The Monitoring Result of Emission Concentration
Boiler 3
Star Petroleum Refining Public Co., Ltd.
November 27, 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	5.00	4.96	50.84	50.86	44.35
2	5.28	5.24	50.24	50.25	44.60
3	5.26	5.22	50.98	51.00	45.21
Average	5.18	5.14	50.69	50.70	44.72

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	5.00	4.96	0.80	0.76	0.66
2	5.28	5.24	1.12	1.08	0.96
3	5.26	5.22	1.29	1.26	1.12
Average	5.18	5.14	1.07	1.03	0.91

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	5.00	4.96	0.05	0.05	0.04
2	5.28	5.24	0.10	0.10	0.09
3	5.26	5.22	0.05	0.05	0.04
Average	5.18	5.14	0.07	0.07	0.06



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Star Petroleum Refining Public Co., Ltd. Emission Test Result

Run # : 1

Date: 27 November 2025

Location : Boiler 3

Start time: 11:10 AM

Finish time : 11:30 AM

O₂ instrument Model: AMI 70

Serial No.: 161212-14

NO_x instrument Model: TELEDYNE 200 EM

Serial No.: 433

SO₂ instrument Model: API 100 AH

Serial No.: 118

CO instrument Model: THERMO 48 C

Serial No.: 0412106049

Fuel Type : Natural Gas

Test Operator : Kittipong T.

Time, min	O ₂ (%)	NO _x (ppm)	SO ₂ (ppm)	CO (ppm)
11:10 AM	5.07	51.51	0.53	0.10
11:11 AM	5.21	51.02	0.58	0.09
11:12 AM	5.26	50.44	0.59	0.08
11:13 AM	5.11	50.41	0.62	0.07
11:14 AM	4.74	50.88	0.62	0.24
11:15 AM	4.73	51.18	0.64	0.06
11:16 AM	4.96	51.12	0.72	0.05
11:17 AM	5.15	51.21	0.73	0.05
11:18 AM	4.79	51.09	0.74	0.04
11:19 AM	4.80	50.62	0.84	0.04
11:20 AM	4.68	50.11	0.80	0.03
11:21 AM	4.77	50.12	0.79	0.02
11:22 AM	4.93	50.62	0.88	0.02
11:23 AM	4.92	51.48	0.92	0.00
11:24 AM	4.88	51.67	0.92	0.00
11:25 AM	5.08	51.38	0.98	0.00
11:26 AM	5.10	51.03	0.99	0.01
11:27 AM	5.25	50.45	0.91	0.01
11:28 AM	5.33	50.18	0.91	0.02
11:29 AM	5.25	50.42	0.98	0.02
11:30 AM	4.96	50.80	1.01	0.02
Average	5.00	50.84	0.80	0.05

Signature

Miss Katesarin Vorradetwittaya

Environmental Scientist



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Star Petroleum Refining Public Co., Ltd. Emission Test Result

Run # : 2

Date: 27 November 2025

Location : Boiler 3

Start time: 11:31 AM

Finish time : 11:51 AM

O₂ instrument Model: AMI 70

Serial No.: 161212-14

NO_x instrument Model: TELEDYNE 200 EM

Serial No.: 433

SO₂ instrument Model: API 100 AH

Serial No.: 118

CO instrument Model: THERMO 48 C

Serial No.: 0412106049

Fuel Type : Natural Gas

Test Operator : Kittipong T.

Time, min	O ₂ (%)	NO _x (ppm)	SO ₂ (ppm)	CO (ppm)
11:31 AM	5.07	50.24	1.00	0.02
11:32 AM	5.25	49.32	1.03	0.06
11:33 AM	5.21	48.96	1.00	0.80
11:34 AM	5.10	49.30	1.01	0.05
11:35 AM	5.10	49.82	0.98	0.03
11:36 AM	4.99	50.17	1.05	0.04
11:37 AM	4.84	50.16	1.01	0.04
11:38 AM	5.50	49.95	1.05	0.04
11:39 AM	5.55	49.95	1.09	0.04
11:40 AM	5.42	50.27	1.13	0.04
11:41 AM	5.35	50.40	1.18	0.04
11:42 AM	5.39	50.29	1.21	0.04
11:43 AM	5.35	50.53	1.17	0.05
11:44 AM	5.11	51.00	1.15	0.46
11:45 AM	5.36	51.29	1.18	0.04
11:46 AM	5.48	51.35	1.24	0.05
11:47 AM	5.47	50.92	1.16	0.05
11:48 AM	5.30	50.49	1.22	0.05
11:49 AM	5.22	50.24	1.22	0.12
11:50 AM	5.45	50.05	1.22	0.05
11:51 AM	5.34	50.31	1.22	0.05
Average	5.28	50.24	1.12	0.10

Signature

Miss Katesarin Vorradetwittaya

Environmental Scientist



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Star Petroleum Refining Public Co., Ltd. Emission Test Result

Date:	27 November 2025	Run # :	3
Start time:	11:52 AM	Location :	Boiler 3
O₂ instrument Model:	AMI 70	Finish time :	12:12 PM
NO_x instrument Model:	TELEDYNE 200 EM	Serial No.:	161212-14
SO₂ instrument Model:	API 100 AH	Serial No.:	433
CO instrument Model:	THERMO 48 C	Serial No.:	118
Fuel Type :	Natural Gas	Serial No.:	0412106049
		Test Operator :	Kittipong T.

Time, min	O ₂ (%)	NO _x (ppm)	SO ₂ (ppm)	CO (ppm)
11:52 AM	5.23	50.62	1.26	0.04
11:53 AM	5.18	50.91	1.26	0.05
11:54 AM	5.04	51.65	1.28	0.05
11:55 AM	4.93	52.11	1.32	0.05
11:56 AM	4.86	52.06	1.33	0.05
11:57 AM	5.06	51.83	1.29	0.04
11:58 AM	5.26	51.41	1.33	0.05
11:59 AM	5.33	50.90	1.26	0.05
12:00 PM	5.61	50.51	1.26	0.05
12:01 PM	5.57	50.06	1.30	0.05
12:02 PM	5.63	49.79	1.24	0.05
12:03 PM	5.34	49.84	1.25	0.05
12:04 PM	5.21	50.03	1.28	0.05
12:05 PM	5.12	50.42	1.25	0.06
12:06 PM	5.15	50.70	1.34	0.05
12:07 PM	5.49	50.87	1.32	0.06
12:08 PM	5.35	51.10	1.26	0.06
12:09 PM	5.38	51.45	1.26	0.06
12:10 PM	5.21	51.79	1.35	0.07
12:11 PM	5.15	51.61	1.35	0.07
12:12 PM	5.30	50.96	1.23	0.07
Average	5.26	50.98	1.29	0.05

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-2511-0075
SAMPLING BY	: SECOT Co., Ltd.	REGISTRATION NO.	: ๓-239
SAMPLING DATE	: 26/11/2025	SAMPLING TIME	: 11.30 a.m. - 02.00 p.m.
RECEIVED DATE	: 01/12/2025	ANALYTICAL DATE	: 02-04/12/2025
REPORT DATE	: 09/12/2025	SAMPLE CONDITION	: Normal
SOURCE DESCRIPTION	: Combustion	SITE OPERATOR	: Mr. Kittipong Thakoengsuk
FUEL TYPE	: Natural Gas + Refinery Fuel Gas	REGISTRATION NO.	: ๓-239-0024
STACK LOCATION	: HRSG#2 (UTM : 734500E, 1404937N)		

STACK DESCRIPTION

Height	: 21.7	m	Flow Rate ⁽¹⁾	: 3,544	Ncu.m/min
Diameter	: 3.0	m	Excess Oxygen	: 14.62	%
Temperature	: 200.58	°C	Moisture Content	: 10.96	%
Gas Velocity	: 14.97	m/s			

PARAMETER	RESULTS ⁽¹⁾		EIA ⁽²⁾ / STANDARD ⁽³⁾	EMISSION RATE		REFERENCE METHOD
	mg/Ncu.m		mg/Ncu.m	g/s		
	14.62%O ₂	7%O ₂	7%O ₂	RESULT	EIA ⁽²⁾	
Particulate Matter (PM)	1.46	3.23	60/60	0.086	0.330	US. EPA Method 5



(Miss Pornnapa Budthum)

Analyst

REG.NO.๓-239-๓-0018



(Miss Narisa Poowasanpetch)

Technical Management Team

REG.NO.๓-239-๓-0010

- Remark :**
1. Reported analysis refers to submitted sample only.
 2. This report shall not be reproduced, except in full, without official approval.
 3. ⁽¹⁾ At standard pressure of 760 mmHg and temperature of 25 °C, dry basis.
 4. ⁽²⁾ Assigned value in EIA Report Expasion 3 of Refinery Plant, B.E. 2561 (2018).
 5. ⁽³⁾ 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-2511-0075
SAMPLING BY	: SECOT Co., Ltd.	REGISTRATION NO.	: ๓-239
SAMPLING DATE	: 26/11/2025	SAMPLING TIME	: 11.30 a.m. - 02.00 p.m.
RECEIVED DATE	: 06/12/2025	ANALYTICAL DATE	: 15/12/2025-12/01/2026
REPORT DATE	: 12/01/2026	SAMPLE CONDITION	: Normal
SOURCE DESCRIPTION	: Combustion	SITE OPERATOR	: Mr. Kittipong Thakoengsuk
FUEL TYPE	: Natural Gas + Refinery Fuel Gas	REGISTRATION NO.	: ๓-239-0024
STACK LOCATION	: HRSG#2 (UTM : 734500E, 1404937N)		

STACK DESCRIPTION

Height	: 21.7	m	Flow Rate ⁽¹⁾	: 3,544	Ncu.m/min
Diameter	: 3.0	m	Excess Oxygen	: 14.62	%
Temperature	: 200.58	°C	Moisture Content	: 10.96	%
Gas Velocity	: 14.97	m/s			

PARAMETER	RESULT ⁽¹⁾				EIA ⁽²⁾ / STANDARD ⁽³⁾		EMISSION RATE		REFERENCE METHOD
	ppm		mg/Ncu.m.		ppm	mg/Ncu.m.	g/s		
	14.62%O ₂	7%O ₂	14.62%O ₂	7%O ₂	7%O ₂	7%O ₂	RESULT	EIA ⁽²⁾	
Sulfur Dioxide (SO ₂)	0.51	1.14	1.33	2.98	10/60	26/157	0.079	0.200	US. EPA Method 6C
Oxide of Nitrogen (NO _x)	50.47	111.65	94.95	210.06	160/200	301/376	5.609	5.750	US. EPA Method 7E
Carbon Monoxide (CO)	9.60	21.23	10.99	24.31	100/690	115/790	0.649	1.000	US. EPA Method 10

(Miss Katesarin Vorradetwittaya)

Environmental Scientist

REG.NO. ๓-239-๓-0006

(Miss Preeda Somjai)

Technical Management Team

REG.NO. ๓-239-๓-0006

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

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

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

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



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**The Monitoring Result of Emission Concentration
HRSO 2
Star Petroleum Refining Public Co., Ltd.
November 26, 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	14.79	14.68	47.30	47.31	105.72
2	14.70	14.59	50.96	50.97	112.28
3	14.70	14.58	53.12	53.13	116.85
Average	14.73	14.62	50.46	50.47	111.65

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	14.79	14.68	0.54	0.48	1.07
2	14.70	14.59	0.69	0.62	1.37
3	14.70	14.58	0.51	0.44	0.97
Average	14.73	14.62	0.58	0.51	1.14

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	14.79	14.68	9.18	9.15	20.45
2	14.70	14.59	9.34	9.30	20.49
3	14.70	14.58	10.38	10.34	22.74
Average	14.73	14.62	9.64	9.60	21.23



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Star Petroleum Refining Public Co., Ltd. Emission Test Result

Run # : 1

Date: 26 November 2025

Location : HRSG 2

Start time: 11:30 AM

Finish time : 11:50 AM

O₂ instrument Model: AMI 70

Serial No.: 121121-10

NO_x instrument Model: API 200 AH

Serial No.: 441

SO₂ instrument Model: API 100 AH

Serial No.: 060

CO instrument Model: THERMO 48 C

Serial No.: 365

Fuel Type : Natural Gas

Test Operator : Kittipong T.

Time, min	O ₂ (%)	NO _x (ppm)	SO ₂ (ppm)	CO (ppm)
11:30 AM	15.07	44.98	0.29	9.80
11:31 AM	15.05	44.74	0.31	10.23
11:32 AM	15.08	44.73	0.36	10.23
11:33 AM	15.11	44.83	0.37	10.24
11:34 AM	15.08	45.06	0.42	10.24
11:35 AM	14.64	45.65	0.43	10.42
11:36 AM	14.64	45.83	0.48	9.75
11:37 AM	14.63	46.34	0.49	4.83
11:38 AM	14.65	46.83	0.48	4.59
11:39 AM	14.67	47.06	0.53	7.01
11:40 AM	14.71	47.62	0.54	10.27
11:41 AM	14.73	48.02	0.57	9.43
11:42 AM	14.73	48.34	0.63	10.28
11:43 AM	14.71	48.50	0.67	10.29
11:44 AM	14.74	48.62	0.66	10.30
11:45 AM	14.73	48.62	0.68	10.30
11:46 AM	14.75	49.13	0.71	10.31
11:47 AM	14.71	49.15	0.68	10.31
11:48 AM	14.70	49.43	0.65	10.32
11:49 AM	14.69	49.85	0.72	7.82
11:50 AM	14.70	50.06	0.76	5.90
Average	14.79	47.30	0.54	9.18

Signature

Miss Katesarin Vorradetwittaya

Environmental Scientist



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Star Petroleum Refining Public Co., Ltd. Emission Test Result

Run # : 2

Date: 26 November 2025

Location : HRSG 2

Start time: 11:51 AM

Finish time : 12:11 PM

O₂ instrument Model: AMI 70

Serial No.: 121121-10

NO_x instrument Model: API 200 AH

Serial No.: 441

SO₂ instrument Model: API 100 AH

Serial No.: 060

CO instrument Model: THERMO 48 C

Serial No.: 365

Fuel Type : Natural Gas

Test Operator : Kittipong T.

Time, min	O ₂ (%)	NO _x (ppm)	SO ₂ (ppm)	CO (ppm)
11:51 AM	14.70	50.21	0.70	10.40
11:52 AM	14.70	50.74	0.76	10.33
11:53 AM	14.70	51.24	0.69	10.34
11:54 AM	14.70	51.13	0.70	10.34
11:55 AM	14.71	50.86	0.75	8.92
11:56 AM	14.72	50.59	0.72	10.26
11:57 AM	14.71	50.34	0.68	9.77
11:58 AM	14.70	50.40	0.76	3.92
11:59 AM	14.70	50.66	0.70	10.35
12:00 PM	14.70	50.87	0.63	10.35
12:01 PM	14.70	50.87	0.68	10.36
12:02 PM	14.70	50.93	0.70	10.36
12:03 PM	14.73	50.98	0.69	10.37
12:04 PM	14.72	51.14	0.70	4.02
12:05 PM	14.70	51.27	0.71	9.46
12:06 PM	14.69	51.51	0.66	4.87
12:07 PM	14.70	51.44	0.69	10.28
12:08 PM	14.70	51.31	0.67	10.37
12:09 PM	14.70	51.18	0.67	10.37
12:10 PM	14.70	51.11	0.68	10.37
12:11 PM	14.70	51.30	0.62	10.37
Average	14.70	50.96	0.69	9.34

Signature

Miss Katesarin Vorradetwittaya

Environmental Scientist



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Star Petroleum Refining Public Co., Ltd. Emission Test Result

Run # : 3

Date: 26 November 2025

Location : HRSG 2

Start time: 12:12 PM

Finish time : 12:32 PM

O₂ instrument Model: AMI 70

Serial No.: 121121-10

NO_x instrument Model: API 200 AH

Serial No.: 441

SO₂ instrument Model: API 100 AH

Serial No.: 060

CO instrument Model: THERMO 48 C

Serial No.: 365

Fuel Type : Natural Gas

Test Operator : Kittipong T.

Time, min	O ₂ (%)	NO _x (ppm)	SO ₂ (ppm)	CO (ppm)
12:12 PM	14.71	51.23	0.66	10.37
12:13 PM	14.70	50.99	0.65	10.37
12:14 PM	14.70	51.65	0.61	10.38
12:15 PM	14.70	53.27	0.52	10.38
12:16 PM	14.71	53.87	0.50	10.38
12:17 PM	14.70	54.05	0.50	10.38
12:18 PM	14.69	53.68	0.58	10.38
12:19 PM	14.70	53.82	0.55	10.38
12:20 PM	14.70	53.96	0.51	10.38
12:21 PM	14.69	54.04	0.54	10.38
12:22 PM	14.70	53.72	0.51	10.38
12:23 PM	14.71	53.40	0.50	10.38
12:24 PM	14.70	53.39	0.50	10.38
12:25 PM	14.70	53.45	0.51	10.38
12:26 PM	14.70	53.17	0.45	10.38
12:27 PM	14.70	52.90	0.46	10.38
12:28 PM	14.69	53.24	0.53	10.38
12:29 PM	14.70	53.43	0.42	10.38
12:30 PM	14.70	53.29	0.39	10.39
12:31 PM	14.71	53.03	0.38	10.38
12:32 PM	14.71	51.93	0.40	10.38
Average	14.70	53.12	0.51	10.38

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-2511-0075
SAMPLING BY	: SECOT Co., Ltd.	REGISTRATION NO.	: -
SAMPLING DATE	: 25/11/2025	SAMPLING TIME	: 02.15-03.15 p.m.
RECEIVED DATE	: 28/11/2025	ANALYTICAL DATE	: 03/12/2025
REPORT DATE	: 10/12/2025	SAMPLE CONDITION	: Normal
SOURCE DESCRIPTION	: Process	SITE OPERATOR	: Mr. Kittipong Thakoengsuk
FUEL TYPE	: -	REGISTRATION NO.	: -
STACK LOCATION	: VRU Stack		

STACK DESCRIPTION

Height	: 10.0	m.	Velocity ⁽¹⁾	: 2.32	m/s
Diameter	: 0.25	m.	Flow Rate ⁽¹⁾	: 6.34	Nm ³ /min
Temperature ⁽¹⁾	: 36.0	°C	Excess Oxygen ⁽¹⁾	: 20.70	%

PARAMETER	UNIT	RESULTS		EIA ⁽²⁾	STANDARD ⁽³⁾	REFERENCE METHODS
		INLET	OUTLET			
TVOCs	ppm	25,925	14.54	-	-	US. EPA Method 25A
	mg/Ncu.m.	46,654	26.17	-	-	
	mg/l	46.65	0.03	15	17	
	g/s	-	0.003	1.212	-	

Sudaporn S.

(Miss Sudaporn Soonthorn)

Analyst

Narisa Poowasanpeth

(Miss Narisa Poowasanpeth)

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. ⁽¹⁾ The data from VRU Outlet.

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

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



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STACK EMISSION ANALYSIS REPORT

CLIENT NAME	: Star Petroleum Refining Public Co., Ltd.	REF. NO.	: 225003-STK-2511-0075
SAMPLING BY	: SECOT Co., Ltd.	REGISTRATION NO.	: -
SAMPLING DATE	: 25/11/2025	SAMPLING TIME	: 02.15-03.15 p.m.
RECEIVED DATE	: 28/11/2025	ANALYTICAL DATE	: 02/12/2025
REPORT DATE	: 10/12/2025	SAMPLE CONDITION	: Normal
SOURCE DESCRIPTION	: Process	SITE OPERATOR	: Mr. Kittipong Thakoengsuk
FUEL TYPE	: -	REGISTRATION NO.	: -
STACK LOCATION	: VRU Stack		

STACK DESCRIPTION

Height	: 10.0	m.	Velocity ⁽¹⁾	: 2.32	m/s
Diameter	: 0.25	m.	Flow Rate ⁽¹⁾	: 6.34	Nm ³ /min
Temperature ⁽¹⁾	: 36.0	°C	Excess Oxygen ⁽¹⁾	: 20.70	%

PARAMETER	UNIT	RESULTS		EIA ⁽²⁾	STANDARD	REFERENCE METHODS
		INLET	OUTLET			
Benzene	ppm	163.57	0.27	-	-	US. EPA Method 18
	mg/Ncu.m.	522.47	0.85	-	-	
	mg/l	0.52	0.0008	0.21	-	
	g/s	-	0.00009	0.017	-	

Sudaporn S.

(Miss Sudaporn Soonthorn)

Analyst

Narisa Poowasanpetch

(Miss Narisa Poowasanpetch)

Technical Management Team

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

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WATER AND WASTEWATER ANALYSIS REPORT

CLIENT NAME	: Star Petroleum Refining Public Co., Ltd.	REQUEST SERVICE No.	: 1238/68
SAMPLING BY	: SECOT Co., Ltd.	REGISTRATION No.	: จ-239
SAMPLING DATE	: 03/07/2025	SAMPLING METHOD	: Grab
RECEIVED DATE	: 04/07/2025	SAMPLING TIME	: 08:33
ANALYTICAL DATE	: 04-14/07/2025	SITE OPERATOR	: Mr. Jeerawat Khothamhan
REPORT DATE	: 15/07/2025	FILE CODE	: 225003_WW_July
SAMPLE CONDITION	: เหลืองใสมีตะกอน		

PARAMETER	UNIT	ANALYSIS METHODS	ND (non-detectable)	STATION	STANDARD ^{1/}
				Near the refinery outfall	
Temperature	°C	2550 B	< 0.5	30.5	≤ 40
pH	-	4500-H ⁺ B	< 0.10	8.15	5.5-9.0
Total Dissolved Solids	mg/l	2540 C	< 25	1,276	≤ 3,000
Total Suspended Solids	mg/l	2540 D	< 2.5	17	≤ 50
Sulfide	mg/l	4500-S ²⁻ 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 ₅	mg/l	5210 B	< 1.0	< 1.0	≤ 20
COD	mg/l	5220 D	< 10.00	< 40.00	≤ 120
Chromium Hexavalent (Cr ⁶⁺)	mg/l	3500-Cr B	< 0.01	ND	≤ 0.25
Chromium Trivalent (Cr ³⁺)	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 23rd ED. 2017 (AWWA, APHA, WEF)

Khemchuda Insorn

(Miss Khemchuda Insorn)

Analyst

REG. NO. จ-239-ก-0005

Araya Tipparuk

(Mrs. Araya Tipparuk)

Technical Management Team

REG. NO. จ-239-ก-0004

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

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3. ^{1/} Notification of the Ministry of Industry, Regarding Industrial Effluent Standards, B.E.2560 (2017).

4. - Not available.



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WATER AND WASTEWATER ANALYSIS REPORT

CLIENT NAME	: Star Petroleum Refining Public Co., Ltd.	REQUEST SERVICE No.	: 1238/68
SAMPLING BY	: SECOT Co., Ltd.	REGISTRATION No.	: -
SAMPLING DATE	: 03/07/2025	SAMPLING METHOD	: Grab
RECEIVED DATE	: 04/07/2025	SAMPLING TIME	: 08:33
ANALYTICAL DATE	: 04/07/2025	SITE OPERATOR	: Mr. Jeerawat Khothamhan
REPORT DATE	: 15/07/2025		: -
SAMPLE CONDITION	: เหลืองใสมีตะกอน	FILE CODE	: 225003_WW_July

PARAMETER	UNIT	ANALYSIS METHODS	ND (non-detectable)	STATION	STANDARD
				Near the refinery outfall	
Ammonia Nitrogen	mg/l	Method 350.2	< 0.02	0.25	-

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

Khemchuda Insorn

(Miss Khemchuda Insorn)

Analyst

Araya Tipparuk

(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.	: 1447/68
SAMPLING BY	: SECOT Co., Ltd.	REGISTRATION No.	: ๖-239
SAMPLING DATE	: 07/08/2025	SAMPLING METHOD	: Grab
RECEIVED DATE	: 08/08/2025	SAMPLING TIME	: 08:57
ANALYTICAL DATE	: 08-18/08/2025	SITE OPERATOR	: Mr. Baworn Deechaiya
REPORT DATE	: 18/08/2025		: ๖-239-๖-0005
SAMPLE CONDITION	: เหลืองใสมีตะกอน	FILE CODE	: 225003_WW_August

PARAMETER	UNIT	ANALYSIS METHODS	ND (non-detectable)	STATION	STANDARD ^{1/}
				Near the refinery outfall	
Temperature	°C	2550 B	< 0.5	32.9	≤ 40
pH	-	4500-H ⁺ B	< 0.10	8.09	5.5-9.0
Total Dissolved Solids	mg/l	2540 C	< 25	1,272	≤ 3,000
Total Suspended Solids	mg/l	2540 D	< 2.5	14	≤ 50
Sulfide	mg/l	4500-S ²⁻ 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 ₅	mg/l	5210 B	< 1.0	< 1.0	≤ 20
COD	mg/l	5220 D	< 40.00	< 40.00	≤ 120
Chromium Hexavalent (Cr ⁶⁺)	mg/l	3500-Cr B	< 0.01	ND	≤ 0.25
Chromium Trivalent (Cr ³⁺)	mg/l	3113 B/Calculation	< 0.001	ND	≤ 0.75
Mercury (Hg)	mg/l	3112 B	< 0.0005	0.0011	≤ 0.005

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

(Miss Khemchuda Insorn)

Analyst

REG. NO. ๖-239-๖-0005

(Mrs. Araya Tipparuk)

Technical Management Team

REG. NO. ๖-239-๖-0004

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WATER AND WASTEWATER ANALYSIS REPORT

CLIENT NAME	: Star Petroleum Refining Public Co., Ltd.	REQUEST SERVICE No.	: 1447/68
SAMPLING BY	: SECOT Co., Ltd.	REGISTRATION No.	: -
SAMPLING DATE	: 07/08/2025	SAMPLING METHOD	: Grab
RECEIVED DATE	: 08/08/2025	SAMPLING TIME	: 08:57
ANALYTICAL DATE	: 11/08/2025	SITE OPERATOR	: Mr. Baworn Deechaiya
REPORT DATE	: 18/08/2025		: -
SAMPLE CONDITION	: เหลืองใสมีตะกอน	FILE CODE	: 225003_WW_August

PARAMETER	UNIT	ANALYSIS	ND	STATION	STANDARD
		METHODS	(non-detectable)	Near the refinery outfall	
Ammonia Nitrogen	mg/l	Method 350.2	< 0.02	0.11	-

REFERENCE : STANDARD METHODS FOR EXAMINATION OF WATER AND WASTEWATER 23rd 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.	: 1670/68
SAMPLING BY	: SECOT Co., Ltd.	REGISTRATION No.	: ๓-239
SAMPLING DATE	: 04/09/2025	SAMPLING METHOD	: Grab
RECEIVED DATE	: 05/09/2025	SAMPLING TIME	: 08:55
ANALYTICAL DATE	: 05-15/09/2025	SITE OPERATOR	: Mr.Tanachot Changlor
REPORT DATE	: 17/09/2025	FILE CODE	: ๓-239-๓-0020
SAMPLE CONDITION	: เหลืองใส		: 225003_WW_September

PARAMETER	UNIT	ANALYSIS METHODS	ND (non-detectable)	STATION	STANDARD ^{1/}
				Near the refinery outfall	
Temperature	°C	2550 B	< 0.5	31.8	≤ 40
pH	-	4500-H ⁺ B	< 0.10	7.19	5.5-9.0
Total Dissolved Solids	mg/l	2540 C	< 25	1,114	≤ 3,000
Total Suspended Solids	mg/l	2540 D	< 2.5	3.8	≤ 50
Sulfide	mg/l	4500-S ²⁻ 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 ₅	mg/l	5210 B	< 1.0	< 1.0	≤ 20
COD	mg/l	5220 D	< 40.00	< 40.00	≤ 120
Chromium Hexavalent (Cr ⁶⁺)	mg/l	3500-Cr B	< 0.01	ND	≤ 0.25
Chromium Trivalent (Cr ³⁺)	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 23rd ED. 2017 (AWWA, APHA, WEF)

(Miss Khemchuda Insorn)

Analyst

REG. NO. ๓-239-ค-0005

(Mrs. Araya Tipparuk)

Technical Management Team

REG. NO. ๓-239-ค-0004

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WATER AND WASTEWATER ANALYSIS REPORT

CLIENT NAME	: Star Petroleum Refining Public Co., Ltd.	REQUEST SERVICE No.	: 1670/68
SAMPLING BY	: SECOT Co., Ltd.	REGISTRATION No.	: -
SAMPLING DATE	: 04/09/2025	SAMPLING METHOD	: Grab
RECEIVED DATE	: 05/09/2025	SAMPLING TIME	: 08:55
ANALYTICAL DATE	: 12/09/2025	SITE OPERATOR	: Mr.Tanachot Changlor
REPORT DATE	: 17/09/2025		: -
SAMPLE CONDITION	: เหลืองใส	FILE CODE	: 225003_WW_September

PARAMETER	UNIT	ANALYSIS METHODS	ND (non-detectable)	STATION Near the refinery outfall	STANDARD
Ammonia Nitrogen	mg/l	Method 350.2	< 0.02	0.33	-

REFERENCE : STANDARD METHODS FOR EXAMINATION OF WATER AND WASTEWATER 23rd 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.	: 1886/68
SAMPLING BY	: SECOT Co., Ltd.	REGISTRATION No.	: ๓-239
SAMPLING DATE	: 03/10/2025	SAMPLING METHOD	: Grab
RECEIVED DATE	: 04/10/2025	SAMPLING TIME	: 09:42
ANALYTICAL DATE	: 04-14/10/2025	SITE OPERATOR	: Miss Wiraya Patchimboon
REPORT DATE	: 14/10/2025		: ๓-239-๓-0038
SAMPLE CONDITION	: เหลืองใส	FILE CODE	: 225003_WW_October

PARAMETER	UNIT	ANALYSIS METHODS	ND (non-detectable)	STATION	STANDARD ^{1/}
				Near the refinery outfall	
Temperature	°C	2550 B	< 0.5	32.1	≤ 40
pH		4500-H ⁺ B	< 0.10	7.76	5.5-9.0
Total Dissolved Solids	mg/l	2540 C	< 25	970	≤ 3,000
Total Suspended Solids	mg/l	2540 D	< 2.5	7.4	≤ 50
Sulfide	mg/l	4500-S ²⁻ 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 ₅	mg/l	5210 B	< 1.0	< 1.0	≤ 20
COD	mg/l	5220 D	< 40.00	< 40.00	≤ 120
Chromium Hexavalent (Cr ⁶⁺)	mg/l	3500-Cr B	< 0.01	ND	≤ 0.25
Chromium Trivalent (Cr ³⁺)	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 23rd ED. 2017 (AWWA, APHA, WEF)

(Miss Khemchuda Insorn)

Analyst

REG. NO. ๓-239-๓-0005

(Mrs. Araya Tipparuk)

Technical Management Team

REG. NO. ๓-239-๓-0004

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WATER AND WASTEWATER ANALYSIS REPORT

CLIENT NAME	: Star Petroleum Refining Public Co., Ltd.	REQUEST SERVICE No.	: 1886/68
SAMPLING BY	: SECOT Co., Ltd.	REGISTRATION No.	: -
SAMPLING DATE	: 03/10/2025	SAMPLING METHOD	: Grab
RECEIVED DATE	: 04/10/2025	SAMPLING TIME	: 09:42
ANALYTICAL DATE	: 1/0/1900	SITE OPERATOR	: Miss Wiraya Patchimboon
REPORT DATE	: 14/10/2025		: -
SAMPLE CONDITION	: เหลืองใส	FILE CODE	: 225003_WW_October

PARAMETER	UNIT	ANALYSIS	ND	STATION	STANDARD
		METHODS	(non-detectable)	Near the refinery outfall	
Ammonia Nitrogen	mg/l	Method 350.2	< 0.02	0.20	-

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

(Miss Khemchuda Insorn)

Analyst

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WATER AND WASTEWATER ANALYSIS REPORT

CLIENT NAME	: Star Petroleum Refining Public Co., Ltd.	REQUEST SERVICE No.	: 2118/68
SAMPLING BY	: SECOT Co., Ltd.	REGISTRATION No.	: ๖-239
SAMPLING DATE	: 07/11/2025	SAMPLING METHOD	: Grab
RECEIVED DATE	: 08/11/2025	SAMPLING TIME	: 09:31
ANALYTICAL DATE	: 08-14/11/2025	SITE OPERATOR	: Mr. Baworn Deechaiya
REPORT DATE	: 15/11/2025		: ๖-239-๖-0005
SAMPLE CONDITION	: เหลืองใสมีตะกอน	FILE CODE	: 225003_WW_November

PARAMETER	UNIT	ANALYSIS	ND	STATION	STANDARD ^{1/}
		METHODS	(non-detectable)	Near the refinery outfall	
Temperature	°C	2550 B	< 0.5	29.6	≤ 40
pH		4500-H ⁺ B	< 0.10	7.61	5.5-9.0
Total Dissolved Solids	mg/l	2540 C	< 25	852	≤ 3,000
Total Suspended Solids	mg/l	2540 D	< 2.5	5.6	≤ 50
Sulfide	mg/l	4500-S ²⁻ 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 ₅	mg/l	5210 B	< 1.0	1.3	≤ 20
COD	mg/l	5220 D	< 10.00	33.53	≤ 120
Chromium Hexavalent (Cr ⁶⁺)	mg/l	3500-Cr B	< 0.01	ND	≤ 0.25
Chromium Trivalent (Cr ³⁺)	mg/l	3113 B/Calculation	< 0.001	ND	≤ 0.75
Mercury (Hg)	mg/l	3112 B	< 0.0005	0.0005	≤ 0.005

REFERENCE : STANDARD METHODS FOR EXAMINATION OF WATER AND WASTEWATER 24th ED. 2023 (AWWA, APHA, WEF)



(Miss Khemchuda Insorn)

Analyst

REG. NO. ๖-239-๖-0005



(Mrs. Araya Tipparuk)

Technical Management Team

REG. NO. ๖-239-๖-0004

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WATER AND WASTEWATER ANALYSIS REPORT

CLIENT NAME	: Star Petroleum Refining Public Co., Ltd.	REQUEST SERVICE No.	: 2118/68
SAMPLING BY	: SECOT Co., Ltd.	REGISTRATION No.	: -
SAMPLING DATE	: 07/11/2025	SAMPLING METHOD	: Grab
RECEIVED DATE	: 08/11/2025	SAMPLING TIME	: 09:31
ANALYTICAL DATE	: 10/11/2025	SITE OPERATOR	: Mr. Baworn Deechaiya
REPORT DATE	: 15/11/2025		: -
SAMPLE CONDITION	: เหลืองใสมีตะกอน	FILE CODE	: 225003_WW_November

PARAMETER	UNIT	ANALYSIS METHODS	ND (non-detectable)	STATION	STANDARD
				Near the refinery outfall	
Ammonia Nitrogen	mg/l	Method 350.2	< 0.02	0.28	-

REFERENCE : STANDARD METHODS FOR EXAMINATION OF WATER AND WASTEWATER 24th ED. 2023 (AWWA, APHA, WEF)

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Analyst

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Technical Management Team

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WATER AND WASTEWATER ANALYSIS REPORT

CLIENT NAME	: Star Petroleum Refining Public Co., Ltd.	REQUEST SERVICE No.	: 2326/68
SAMPLING BY	: SECOT Co., Ltd.	REGISTRATION No.	: จ-239
SAMPLING DATE	: 04/12/2025	SAMPLING METHOD	: Grab
RECEIVED DATE	: 05/12/2025	SAMPLING TIME	: 08:50
ANALYTICAL DATE	: 05-17/12/2025	SITE OPERATOR	: Mr.Thanawut Duansaeng
REPORT DATE	: 18/12/2025		: จ-239-ท-0031
SAMPLE CONDITION	: เหลืองใสมีตะกอน	FILE CODE	: 225003_WW_December

PARAMETER	UNIT	ANALYSIS METHODS	ND (non-detectable)	STATION	STANDARD ^{1/}
				Near the refinery outfall	
Temperature	°C	2550 B	< 0.5	28.8	≤ 40
pH	-	4500-H ⁺ B	< 0.10	7.43	5.5-9.0
Total Dissolved Solids	mg/l	2540 C	< 25	946	≤ 3,000
Total Suspended Solids	mg/l	2540 D	< 2.5	21	≤ 50
Sulfide	mg/l	4500-S ²⁻ 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 ₅	mg/l	5210 B	< 1.0	< 1.0	≤ 20
COD	mg/l	5220 D	< 10.00	11.76	≤ 120
Chromium Hexavalent (Cr ⁶⁺)	mg/l	3500-Cr B	< 0.01	ND	≤ 0.25
Chromium Trivalent (Cr ³⁺)	mg/l	3113 B/Calculation	< 0.001	ND	≤ 0.75
Mercury (Hg)	mg/l	3112 B	< 0.0005	0.0026	≤ 0.005

REFERENCE : STANDARD METHODS FOR EXAMINATION OF WATER AND WASTEWATER 24th ED. 2023 (AWWA, APHA, WEF)

Khemchuda Insorn

(Miss Khemchuda Insorn)

Analyst

REG. NO. จ-239-ท-0005

Araya Tipparuk

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Technical Management Team

REG. NO. จ-239-ท-0004

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WATER AND WASTEWATER ANALYSIS REPORT

CLIENT NAME	: Star Petroleum Refining Public Co., Ltd.	REQUEST SERVICE No.	: 2326/68
SAMPLING BY	: SECOT Co., Ltd.	REGISTRATION No.	: -
SAMPLING DATE	: 04/12/2025	SAMPLING METHOD	: Grab
RECEIVED DATE	: 05/12/2025	SAMPLING TIME	: 08:50
ANALYTICAL DATE	: 10/12/2025	SITE OPERATOR	: Mr.Thanawut Duansaeng
REPORT DATE	: 18/12/2025		: -
SAMPLE CONDITION	: เหลืองใสมีตะกอน	FILE CODE	: 225003_WW_December

PARAMETER	UNIT	ANALYSIS	ND	STATION	STANDARD
		METHODS	(non-detectable)	Near the refinery outfall	
Ammonia Nitrogen	mg/l	Method 350.2	< 0.02	0.12	-

REFERENCE : STANDARD METHODS FOR EXAMINATION OF WATER AND WASTEWATER 24th ED. 2023 (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.	: 1239/68
SAMPLING BY	: SECOT Co., Ltd.	SAMPLING METHOD	: Grab
SAMPLING DATE	: 03/07/2025	SAMPLING TIME	: 09:51 - 10:29
RECEIVED DATE	: 04/07/2025	ANALYTICAL DATE	: 04-14/07/2025
REPORT DATE	: 15/07/2025	SITE OPERATOR	: Mr. Jeerawat Khothamhan
SAMPLE CONDITION	: Normal	FILE CODE	: 225003_SW_July
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 ^{1/}
				1	2	
Temperature	°C	2550 B	< 0.5	32.4	32.1	-
pH	-	4500-H ⁺ B	< 0.10	8.41	8.25	-
Total Dissolved Solids	mg/l	2540 C	< 25	4,924	3,988	-
Suspended Solids	mg/l	2540 D	< 2.5	58	52	-
Ammonia Nitrogen	mg/l	4500-NH ₃ B,C	< 0.02	1.4	1.4	-
Sulfide as H ₂ S	mg/l	4500-S ²⁻ 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 ₅	mg/l	5210 B	< 1.0	1.4	1.7	-
COD	mg/l	5220 D	< 40.00	< 40.00	< 40.00	-
Chromium Hexavalent (Cr ⁶⁺)	mg/l	3500-Cr B	< 0.01	ND	ND	-
Chromium Trivalent (Cr ³⁺)	mg/l	3113 B/Calculation	< 0.001	0.005	ND	-
Mercury (Hg)	mg/l	3112 B	< 0.0005	ND	ND	-

REFERENCE : STANDARD METHODS FOR EXAMINATION OF WATER AND WASTEWATER 23rd 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.	: 1446/68
SAMPLING BY	: SECOT Co., Ltd.	REGISTRATION No.	: -
SAMPLING DATE	: 07/08/2025	SAMPLING METHOD	: Grab
RECEIVED DATE	: 08/08/2025	SAMPLING TIME	: 11:36
ANALYTICAL DATE	: 08-18/08/2025	SITE OPERATOR	: Mr. Baworn Deechaiya
REPORT DATE	: 18/08/2025		: -
SAMPLE CONDITION	: เหลืองใสมีตะกอน	FILE CODE	: 225003_SW_August
SAMPLE DESCRIPTION	: 1 = Within IEAT drainage channel upstream from refinery outfall		

PARAMETER	UNIT	ANALYSIS METHODS	ND (non-detectable)	STATION	STANDARD ^{1/}
				1	
Temperature	°C	2550 B	< 0.5	34.0	-
pH	-	4500-H ⁺ B	< 0.10	8.64	-
Total Dissolved Solids	mg/l	2540 C	< 25	4,064	-
Suspended Solids	mg/l	2540 D	< 2.5	17	-
Ammonia Nitrogen	mg/l	4500-NH ₃ B,C	< 0.02	5.0	-
Sulfide as H ₂ S	mg/l	4500-S ²⁻ F	< 0.20	ND	-
Fat Oil & Grease	mg/l	5520 B	< 2.0	ND	-
Phenols	mg/l	5530 B,C	< 0.001	ND	-
BOD ₅	mg/l	5210 B	< 1.0	2.5	-
COD	mg/l	5220 D	< 40.00	< 40.00	-
Chromium Hexavalent (Cr ⁶⁺)	mg/l	3500-Cr B	< 0.01	ND	-
Chromium Trivalent (Cr ³⁺)	mg/l	3113 B/Calculation	< 0.001	ND	-
Mercury (Hg)	mg/l	3112 B	< 0.0005	ND	-

REFERENCE : STANDARD METHODS FOR EXAMINATION OF WATER AND WASTEWATER 23rd 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.	: 1668/68
SAMPLING BY	: SECOT Co., Ltd.	REGISTRATION No.	: -
SAMPLING DATE	: 04/09/2025	SAMPLING METHOD	: Grab
RECEIVED DATE	: 05/09/2025	SAMPLING TIME	: 10:40
ANALYTICAL DATE	: 05-12/09/2025	SITE OPERATOR	: Mr.Tanachot Changlor
REPORT DATE	: 12/09/2025		: -
SAMPLE CONDITION	: เหลืองขุ่น	FILE CODE	: 225003_SW_September
SAMPLE DESCRIPTION	: 1 = Within IEAT drainage channel upstream from refinery outfall		

PARAMETER	UNIT	ANALYSIS METHODS	ND (non-detectable)	STATION	STANDARD ^{1/}
				I	
Temperature	°C	2550 B	< 0.5	33.2	-
pH	-	4500-H ⁺ B	< 0.10	8.16	-
Total Dissolved Solids	mg/l	2540 C	< 25	5,096	-
Suspended Solids	mg/l	2540 D	< 2.5	37	-
Ammonia Nitrogen	mg/l	4500-NH ₃ B,C	< 0.02	3.0	-
Sulfide as H ₂ S	mg/l	4500-S ²⁻ F	< 0.20	ND	-
Fat Oil & Grease	mg/l	5520 B	< 2.0	ND	-
Phenols	mg/l	5530 B,C	< 0.001	ND	-
BOD ₅	mg/l	5210 B	< 1.0	2.4	-
COD	mg/l	5220 D	< 40.00	< 40.00	-
Chromium Hexavalent (Cr ⁶⁺)	mg/l	3500-Cr B	< 0.01	ND	-
Chromium Trivalent (Cr ³⁺)	mg/l	3113 B/Calculation	< 0.001	0.004	-
Mercury (Hg)	mg/l	3112 B	< 0.0005	ND	-

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



(Miss Khemchuda Insorn)

Analyst



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WATER AND WASTEWATER ANALYSIS REPORT

CLIENT NAME	: Star Petroleum Refining Public Co., Ltd.	REQUEST SERVICE No.	: 1885/68
SAMPLING BY	: SECOT Co., Ltd.	REGISTRATION No.	: -
SAMPLING DATE	: 03/10/2025	SAMPLING METHOD	: Grab
RECEIVED DATE	: 04/10/2025	SAMPLING TIME	: 11:44
ANALYTICAL DATE	: 04-14/10/2025	SITE OPERATOR	: Miss Wiraya Patchimboon
REPORT DATE	: 14/10/2025		: -
SAMPLE CONDITION	: เหลืองขุ่น	FILE CODE	: 225003_SW_October
SAMPLE DESCRIPTION	: 1 = Within IEAT drainage channel upstream from refinery outfall		

PARAMETER	UNIT	ANALYSIS METHODS	ND (non-detectable)	STATION	STANDARD ^{1/}
				I	
Temperature	°C	2550 B	< 0.5	32.7	-
pH	-	4500-H ⁺ B	< 0.10	7.93	-
Total Dissolved Solids	mg/l	2540 C	< 25	3,192	-
Suspended Solids	mg/l	2540 D	< 2.5	32	-
Ammonia Nitrogen	mg/l	4500-NH ₃ B,C	< 0.02	1.4	-
Sulfide as H ₂ S	mg/l	4500-S ²⁻ F	< 0.20	ND	-
Fat Oil & Grease	mg/l	5520 B	< 2.0	ND	-
Phenols	mg/l	5530 B,C	< 0.001	ND	-
BOD ₅	mg/l	5210 B	< 1.0	1.4	-
COD	mg/l	5220 D	< 40.00	< 40.00	-
Chromium Hexavalent (Cr ⁶⁺)	mg/l	3500-Cr B	< 0.01	ND	-
Chromium Trivalent (Cr ³⁺)	mg/l	3113 B/Calculation	< 0.001	0.002	-
Mercury (Hg)	mg/l	3112 B	< 0.0005	ND	-

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

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Analyst

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WATER AND WASTEWATER ANALYSIS REPORT

CLIENT NAME	: Star Petroleum Refining Public Co., Ltd.	REQUEST SERVICE No.	: 2119/68
SAMPLING BY	: SECOT Co., Ltd.	REGISTRATION No.	: -
SAMPLING DATE	: 07/11/2025	SAMPLING METHOD	: Grab
RECEIVED DATE	: 08/11/2025	SAMPLING TIME	: 11:42
ANALYTICAL DATE	: 08-14/11/2025	SITE OPERATOR	: Mr. Baworn Deechaiya
REPORT DATE	: 15/11/2025		: -
SAMPLE CONDITION	: เหลืองใสมีตะกอน	FILE CODE	: 225003_SW_November
SAMPLE DESCRIPTION	: I = Within IEAT drainage channel upstream from refinery outfall		

PARAMETER	UNIT	ANALYSIS METHODS	ND (non-detectable)	STATION	STANDARD ^{1/}
				I	
Temperature	°C	2550 B	< 0.5	30.5	-
pH	-	4500-H ⁺ B	< 0.10	7.90	-
Total Dissolved Solids	mg/l	2540 C	< 25	3,092	-
Suspended Solids	mg/l	2540 D	< 2.5	19	-
Ammonia Nitrogen	mg/l	4500-NH ₃ B,C	< 0.02	1.5	-
Sulfide as H ₂ S	mg/l	4500-S ²⁻ F	< 0.20	ND	-
Fat Oil & Grease	mg/l	5520 B	< 2.0	ND	-
Phenols	mg/l	5530 B,C	< 0.001	ND	-
BOD ₅	mg/l	5210 B	< 1.0	1.8	-
COD	mg/l	5220 D	< 10.00	17.92	-
Chromium Hexavalent (Cr ⁶⁺)	mg/l	3500-Cr B	< 0.01	ND	-
Chromium Trivalent (Cr ³⁺)	mg/l	3113 B/Calculation	< 0.001	0.001	-
Mercury (Hg)	mg/l	3112 B	< 0.0005	ND	-

REFERENCE : STANDARD METHODS FOR EXAMINATION OF WATER AND WASTEWATER 24th ED. 2023 (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.	: 2327/68
SAMPLING BY	: SECOT Co., Ltd.	REGISTRATION No.	: -
SAMPLING DATE	: 04/12/2025	SAMPLING METHOD	: Grab
RECEIVED DATE	: 05/12/2025	SAMPLING TIME	: 11:30
ANALYTICAL DATE	: 05-17/12/2025	SITE OPERATOR	: Mr.Thanawut Duansaeng
REPORT DATE	: 18/12/2025		: -
SAMPLE CONDITION	: เหลืองใสมีตะกอน	FILE CODE	: 225003_SW_December
SAMPLE DESCRIPTION	: 1 = Within IEAT drainage channel upstream from refinery outfall		

PARAMETER	UNIT	ANALYSIS METHODS	ND (non-detectable)	STATION	STANDARD ^{1/}
				I	
Temperature	°C	2550 B	< 0.5	31.2	-
pH	-	4500-H ⁺ B	< 0.10	8.50	-
Total Dissolved Solids	mg/l	2540 C	< 25	4,780	-
Suspended Solids	mg/l	2540 D	< 2.5	14	-
Ammonia Nitrogen	mg/l	4500-NH ₃ B,C	< 0.02	3.0	-
Sulfide as H ₂ S	mg/l	4500-S ²⁻ F	< 0.20	ND	-
Fat Oil & Grease	mg/l	5520 B	< 2.0	ND	-
Phenols	mg/l	5530 B,C	< 0.001	ND	-
BOD ₅	mg/l	5210 B	< 1.0	1.8	-
COD	mg/l	5220 D	< 10.00	16.47	-
Chromium Hexavalent (Cr ⁶⁺)	mg/l	3500-Cr B	< 0.01	ND	-
Chromium Trivalent (Cr ³⁺)	mg/l	3113 B/Calculation	< 0.001	ND	-
Mercury (Hg)	mg/l	3112 B	< 0.0005	ND	-

REFERENCE : STANDARD METHODS FOR EXAMINATION OF WATER AND WASTEWATER 24th ED., 2023 (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.	: 1446/68
SAMPLING BY	: SECOT Co., Ltd.	REGISTRATION No.	: -
SAMPLING DATE	: 07/08/2025	SAMPLING METHOD	: Grab
RECEIVED DATE	: 08/08/2025	SAMPLING TIME	: 10:45
ANALYTICAL DATE	: 08-18/08/2025	SITE OPERATOR	: Mr. Baworn Deechaiya
REPORT DATE	: 18/08/2025		: -
SAMPLE CONDITION	: เหลืองใสมีตะกอน	FILE CODE	: 225003_SW_August
SAMPLE DESCRIPTION	: 2 = Within IEAT drainage channel downstream from refinery outfall		

PARAMETER	UNIT	ANALYSIS	ND	STATION	STANDARD ^{1/}
		METHODS	(non-detectable)	2	
Temperature	°C	2550 B	< 0.5	33.6	-
pH	-	4500-H ⁺ B	< 0.10	8.52	-
Total Dissolved Solids	mg/l	2540 C	< 25	3,880	-
Suspended Solids	mg/l	2540 D	< 2.5	27	-
Ammonia Nitrogen	mg/l	4500-NH ₃ B,C	< 0.02	6.6	-
Sulfide as H ₂ S	mg/l	4500-S ²⁻ F	< 0.20	ND	-
Fat Oil & Grease	mg/l	5520 B	< 2.0	ND	-
Phenols	mg/l	5530 B,C	< 0.001	ND	-
BOD ₅	mg/l	5210 B	< 1.0	2.9	-
COD	mg/l	5220 D	< 40.00	43.35	-
Chromium Hexavalent (Cr ⁶⁺)	mg/l	3500-Cr B	< 0.01	ND	-
Chromium Trivalent (Cr ³⁺)	mg/l	3113 B/Calculation	< 0.001	ND	-
Mercury (Hg)	mg/l	3112 B	< 0.0005	ND	-

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

(Miss Khemchuda Insorn)

Analyst

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WATER AND WASTEWATER ANALYSIS REPORT

CLIENT NAME	: Star Petroleum Refining Public Co., Ltd.	REQUEST SERVICE No.	: 1668/68
SAMPLING BY	: SECOT Co., Ltd.	REGISTRATION No.	: -
SAMPLING DATE	: 04/09/2025	SAMPLING METHOD	: Grab
RECEIVED DATE	: 05/09/2025	SAMPLING TIME	: 10:04
ANALYTICAL DATE	: 05-12/09/2025	SITE OPERATOR	: Mr. Tanachot Changlor
REPORT DATE	: 12/09/2025		: -
SAMPLE CONDITION	: เหลืองขุ่น	FILE CODE	: 225003_SW_September
SAMPLE DESCRIPTION	: 2 = Within IEAT drainage channel downstream from refinery outfall		

PARAMETER	UNIT	ANALYSIS	ND	STATION	STANDARD ^{1/}
		METHODS	(non-detectable)	2	
Temperature	°C	2550 B	< 0.5	32.5	-
pH	-	4500-H ⁺ B	< 0.10	8.40	-
Total Dissolved Solids	mg/l	2540 C	< 25	3,808	-
Suspended Solids	mg/l	2540 D	< 2.5	20	-
Ammonia Nitrogen	mg/l	4500-NH ₃ B,C	< 0.02	2.2	-
Sulfide as H ₂ S	mg/l	4500-S ²⁻ F	< 0.20	ND	-
Fat Oil & Grease	mg/l	5520 B	< 2.0	ND	-
Phenols	mg/l	5530 B,C	< 0.001	ND	-
BOD ₅	mg/l	5210 B	< 1.0	1.8	-
COD	mg/l	5220 D	< 40.00	< 40.00	-
Chromium Hexavalent (Cr ⁶⁺)	mg/l	3500-Cr B	< 0.01	ND	-
Chromium Trivalent (Cr ³⁺)	mg/l	3113 B/Calculation	< 0.001	0.002	-
Mercury (Hg)	mg/l	3112 B	< 0.0005	ND	-

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



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Analyst



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WATER AND WASTEWATER ANALYSIS REPORT

CLIENT NAME	: Star Petroleum Refining Public Co., Ltd.	REQUEST SERVICE No.	: 1885/68
SAMPLING BY	: SECOT Co., Ltd.	REGISTRATION No.	: -
SAMPLING DATE	: 03/10/2025	SAMPLING METHOD	: Grab
RECEIVED DATE	: 04/10/2025	SAMPLING TIME	: 11:07
ANALYTICAL DATE	: 04-14/10/2025	SITE OPERATOR	: Miss Wiraya Patchimboon
REPORT DATE	: 14/10/2025		: -
SAMPLE CONDITION	: เหลืองขุ่น	FILE CODE	: 225003_SW_October
SAMPLE DESCRIPTION	: 2 = Within IEAT drainage channel downstream from refinery outfall		

PARAMETER	UNIT	ANALYSIS METHODS	ND (non-detectable)	STATION	STANDARD ^{1/}
				2	
Temperature	°C	2550 B	< 0.5	32.1	-
pH	-	4500-H ⁺ B	< 0.10	7.71	-
Total Dissolved Solids	mg/l	2540 C	< 25	2,508	-
Suspended Solids	mg/l	2540 D	< 2.5	26	-
Ammonia Nitrogen	mg/l	4500-NH ₃ B,C	< 0.02	1.4	-
Sulfide as H ₂ S	mg/l	4500-S ²⁻ F	< 0.20	ND	-
Fat Oil & Grease	mg/l	5520 B	< 2.0	ND	-
Phenols	mg/l	5530 B,C	< 0.001	ND	-
BOD ₅	mg/l	5210 B	< 1.0	1.4	-
COD	mg/l	5220 D	< 40.00	< 40.00	-
Chromium Hexavalent (Cr ⁶⁺)	mg/l	3500-Cr B	< 0.01	ND	-
Chromium Trivalent (Cr ³⁺)	mg/l	3113 B/Calculation	< 0.001	0.003	-
Mercury (Hg)	mg/l	3112 B	< 0.0005	ND	-

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



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Analyst



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WATER AND WASTEWATER ANALYSIS REPORT

CLIENT NAME	: Star Petroleum Refining Public Co., Ltd.	REQUEST SERVICE No.	: 2119/68
SAMPLING BY	: SECOT Co., Ltd.	REGISTRATION No.	: -
SAMPLING DATE	: 07/11/2025	SAMPLING METHOD	: Grab
RECEIVED DATE	: 08/11/2025	SAMPLING TIME	: 10:48
ANALYTICAL DATE	: 08-14/11/2025	SITE OPERATOR	: Mr. Baworn Deechaiya
REPORT DATE	: 15/11/2025		: -
SAMPLE CONDITION	: เหลืองใสมีตะกอน	FILE CODE	: 225003_SW_November
SAMPLE DESCRIPTION	: 2 = Within IEAT drainage channel downstream from refinery outfall		

PARAMETER	UNIT	ANALYSIS METHODS	ND (non-detectable)	STATION	STANDARD ^{1/}
				2	
Temperature	°C	2550 B	< 0.5	30.8	-
pH	-	4500-H ⁺ B	< 0.10	8.32	-
Total Dissolved Solids	mg/l	2540 C	< 25	2,572	-
Suspended Solids	mg/l	2540 D	< 2.5	15	-
Ammonia Nitrogen	mg/l	4500-NH ₃ B,C	< 0.02	1.2	-
Sulfide as H ₂ S	mg/l	4500-S ²⁻ F	< 0.20	ND	-
Fat Oil & Grease	mg/l	5520 B	< 2.0	ND	-
Phenols	mg/l	5530 B,C	< 0.001	ND	-
BOD ₅	mg/l	5210 B	< 1.0	2.0	-
COD	mg/l	5220 D	< 10.00	24.28	-
Chromium Hexavalent (Cr ⁶⁺)	mg/l	3500-Cr B	< 0.01	ND	-
Chromium Trivalent (Cr ³⁺)	mg/l	3113 B/Calculation	< 0.001	ND	-
Mercury (Hg)	mg/l	3112 B	< 0.0005	ND	-

REFERENCE : STANDARD METHODS FOR EXAMINATION OF WATER AND WASTEWATER 24th ED., 2023 (AWWA, APHA, WEF)



(Miss Khemchuda Insorn)

Analyst



(Mrs. Araya Tipparuk)

Technical Management Team

- Remark :**
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 3. ^{1/} Notification of the National Environment Board No.8 B.E.2537 (1994) for Surface Water Class 5.
 4. n¹ 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.	: 2327/68
SAMPLING BY	: SECOT Co., Ltd.	REGISTRATION No.	: -
SAMPLING DATE	: 04/12/2025	SAMPLING METHOD	: Grab
RECEIVED DATE	: 05/12/2025	SAMPLING TIME	: 11:48
ANALYTICAL DATE	: 05-17/12/2025	SITE OPERATOR	: Mr.Thanawut Duansaeng
REPORT DATE	: 18/12/2025		: -
SAMPLE CONDITION	: เหลืองใสมีตะกอน	FILE CODE	: 225003_SW_December
SAMPLE DESCRIPTION	: 2 = Within IEAT drainage channel downstream from refinery outfall		

PARAMETER	UNIT	ANALYSIS METHODS	ND (non-detectable)	STATION	STANDARD ^{1/}
				2	
Temperature	°C	2550 B	< 0.5	31.4	-
pH	-	4500-H ⁺ B	< 0.10	8.47	-
Total Dissolved Solids	mg/l	2540 C	< 25	3,496	-
Suspended Solids	mg/l	2540 D	< 2.5	12	-
Ammonia Nitrogen	mg/l	4500-NH ₃ B,C	< 0.02	1.9	-
Sulfide as H ₂ S	mg/l	4500-S ²⁻ F	< 0.20	ND	-
Fat Oil & Grease	mg/l	5520 B	< 2.0	ND	-
Phenols	mg/l	5530 B,C	< 0.001	ND	-
BOD ₅	mg/l	5210 B	< 1.0	1.5	-
COD	mg/l	5220 D	< 10.00	26.47	-
Chromium Hexavalent (Cr ⁶⁺)	mg/l	3500-Cr B	< 0.01	ND	-
Chromium Trivalent (Cr ³⁺)	mg/l	3113 B/Calculation	< 0.001	ND	-
Mercury (Hg)	mg/l	3112 B	< 0.0005	ND	-

REFERENCE : STANDARD METHODS FOR EXAMINATION OF WATER AND WASTEWATER 24th ED., 2023 (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.	: 1238/68
SAMPLING BY	: SECOT Co., Ltd.	REGISTRATION No.	: ๖-239
SAMPLING DATE	: 03/07/2025	SAMPLING METHOD	: Grab
RECEIVED DATE	: 04/07/2025	SAMPLING TIME	: 08:51
ANALYTICAL DATE	: 04-14/07/2025	SITE OPERATOR	: Mr. Jeerawat Khothamhan
REPORT DATE	: 15/07/2025		: ๖-239-๖-0025
SAMPLE CONDITION	: ดำเนิน	FILE CODE	: 225003_WW_July

PARAMETER	UNIT	ANALYSIS METHODS	ND (non-detectable)	STATION
				API Separator Effluent
Temperature	°C	2550 B	< 0.5	34.0
pH	-	4500-H ⁺ B	< 0.10	7.87
Total Dissolved Solids	mg/l	2540 C	< 25	1,168
Suspended Solids	mg/l	2540 D	< 2.5	14
Fat Oil & Grease	mg/l	5520 B	< 2.0	16.1
Phenols	mg/l	5530 B,D	< 0.10	0.98
Sulfide as H ₂ S	mg/l	4500-S ²⁻ F	< 0.20	0.73
BOD ₅	mg/l	5210 B	< 1.0	45.0
COD	mg/l	5220 D	< 10.00	362
Chromium Trivalent (Cr ³⁺)	mg/l	3113 B/Calculation	< 0.001	0.007
Chromium Hexavalent (Cr ⁶⁺)	mg/l	3500-Cr B	< 0.01	ND
Mercury (Hg)	mg/l	3112 B	< 0.0005	0.0103

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



(Miss Khemchuda Insorn)

Analyst

REG. NO. ๖-239-๖-0005



(Mrs. Araya Tipparuk)

Technical Management Team

REG. NO. ๖-239-๖-0004

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WATER AND WASTEWATER ANALYSIS REPORT

CLIENT NAME	: Star Petroleum Refining Public Co., Ltd.	REQUEST SERVICE No.	: 1238/68
SAMPLING BY	: SECOT Co., Ltd.	REGISTRATION No.	: -
SAMPLING DATE	: 03/07/2025	SAMPLING METHOD	: Grab
RECEIVED DATE	: 04/07/2025	SAMPLING TIME	: 08:51
ANALYTICAL DATE	: 04/07/2025	SITE OPERATOR	: Mr. Jeerawat Khothamhan
REPORT DATE	: 15/07/2025		: -
SAMPLE CONDITION	: คำขุน	FILE CODE	: 225003_WW_July

PARAMETER	UNIT	ANALYSIS METHODS	ND (non-detectable)	STATION
				API Separator Effluent
Ammonia Nitrogen	mg/l	4500-NH ₃ B,C	< 0.02	4.5

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



(Miss Khemchuda Insorn)

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Technical Management Team

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WATER AND WASTEWATER ANALYSIS REPORT

CLIENT NAME	: Star Petroleum Refining Public Co., Ltd.	REQUEST SERVICE No.	: 1447/68
SAMPLING BY	: SECOT Co., Ltd.	REGISTRATION No.	: ๖-239
SAMPLING DATE	: 07/08/2025	SAMPLING METHOD	: Grab
RECEIVED DATE	: 08/08/2025	SAMPLING TIME	: 10:01
ANALYTICAL DATE	: 08-18/08/2025	SITE OPERATOR	: Mr. Baworn Deechaiya
REPORT DATE	: 18/08/2025		: ๖-239-๓-0005
SAMPLE CONDITION	: ดำมีตะกอน	FILE CODE	: 225003_WW_August

PARAMETER	UNIT	ANALYSIS METHODS	ND (non-detectable)	STATION
				API Separator Effluent
Temperature	"C	2550 B	< 0.5	35.1
pH		4500-H ⁺ B	< 0.10	6.69
Total Dissolved Solids	mg/l	2540 C	< 25	1,136
Suspended Solids	mg/l	2540 D	< 2.5	40
Fat Oil & Grease	mg/l	5520 B	< 2.0	9.9
Phenols	mg/l	5530 B,D	< 0.10	0.42
Sulfide as H ₂ S	mg/l	4500-S ²⁻ F	< 0.20	0.80
BOD ₅	mg/l	5210 B	< 1.0	54.2
COD	mg/l	5220 D	< 40.00	272
Chromium Trivalent (Cr ³⁺)	mg/l	3113 B/Calculation	< 0.001	0.005
Chromium Hexavalent (Cr ⁶⁺)	mg/l	3500-Cr B	< 0.01	ND
Mercury (Hg)	mg/l	3112 B	< 0.0005	0.0103

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

(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.	: 1447/68
SAMPLING BY	: SECOT Co., Ltd.	REGISTRATION No.	: -
SAMPLING DATE	: 07/08/2025	SAMPLING METHOD	: Grab
RECEIVED DATE	: 08/08/2025	SAMPLING TIME	: 10:01
ANALYTICAL DATE	: 11/08/2028	SITE OPERATOR	: Mr. Baworn Deechaiya
REPORT DATE	: 18/08/2025		: -
SAMPLE CONDITION	: ค่ำมีตะกอน	FILE CODE	: 225003_WW_August

PARAMETER	UNIT	ANALYSIS	ND	STATION
		METHODS	(non-detectable)	API Separator Effluent
Ammonia Nitrogen	mg/l	4500-NH ₃ B,C	< 0.02	4.9

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

(Miss Khemchuda Insorn)

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WATER AND WASTEWATER ANALYSIS REPORT

CLIENT NAME	: Star Petroleum Refining Public Co., Ltd.	REQUEST SERVICE No.	: 1670/68
SAMPLING BY	: SECOT Co., Ltd.	REGISTRATION No.	: ๖-239
SAMPLING DATE	: 04/09/2025	SAMPLING METHOD	: Grab
RECEIVED DATE	: 05/09/2025	SAMPLING TIME	: 09:27
ANALYTICAL DATE	: 05-15/09/2025	SITE OPERATOR	: Mr.Tanachot Changlor
REPORT DATE	: 17/09/2025		: ๖-239-๖-0020
SAMPLE CONDITION	: คำขุ่น	FILE CODE	: 225003_WW_September

PARAMETER	UNIT	ANALYSIS METHODS	ND (non-detectable)	STATION
				API Separator Effluent
Temperature	"C	2550 B	< 0.5	32.1
pH		4500-H ⁺ B	< 0.10	7.83
Total Dissolved Solids	mg/l	2540 C	< 25	1,290
Suspended Solids	mg/l	2540 D	< 2.5	48
Fat Oil & Grease	mg/l	5520 B	< 2.0	9.1
Phenols	mg/l	5530 B,D	< 0.10	0.85
Sulfide as H ₂ S	mg/l	4500-S ²⁻ F	< 0.20	0.15
BOD ₅	mg/l	5210 B	< 1.0	41.2
COD	mg/l	5220 D	< 40.00	232
Chromium Trivalent (Cr ³⁺)	mg/l	3113 B/Calculation	< 0.001	0.004
Chromium Hexavalent (Cr ⁶⁺)	mg/l	3500-Cr B	< 0.01	ND
Mercury (Hg)	mg/l	3112 B	< 0.0005	0.0066

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

(Miss Khemchuda Insorn)

Analyst

REG. NO. ๖-239-๖-0005

(Mrs. Araya Tipparuk)

Technical Management Team

REG. NO. ๖-239-๖-0004

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WATER AND WASTEWATER ANALYSIS REPORT

CLIENT NAME	: Star Petroleum Refining Public Co., Ltd.	REQUEST SERVICE No.	: 1670/68
SAMPLING BY	: SECOT Co., Ltd.	REGISTRATION No.	: -
SAMPLING DATE	: 04/09/2025	SAMPLING METHOD	: Grab
RECEIVED DATE	: 05/09/2025	SAMPLING TIME	: 09:27
ANALYTICAL DATE	: 12/09/2028	SITE OPERATOR	: Mr.Tanachot Changlor
REPORT DATE	: 17/09/2025		: -
SAMPLE CONDITION	: ดำขุ่น	FILE CODE	: 225003_WW_September

PARAMETER	UNIT	ANALYSIS METHODS	ND (non-detectable)	STATION
				API Separator Effluent
Ammonia Nitrogen	mg/l	4500-NH ₃ B,C	< 0.02	5.0

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

(Miss Khemchuda Insorn)

Analyst

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WATER AND WASTEWATER ANALYSIS REPORT

CLIENT NAME	: Star Petroleum Refining Public Co., Ltd.	REQUEST SERVICE No.	: 1886/68
SAMPLING BY	: SECOT Co., Ltd.	REGISTRATION No.	: ๖-239
SAMPLING DATE	: 03/10/2025	SAMPLING METHOD	: Grab
RECEIVED DATE	: 04/10/2025	SAMPLING TIME	: 10:24
ANALYTICAL DATE	: 04-14/10/2025	SITE OPERATOR	: Miss Wiraya Patchimboon
REPORT DATE	: 14/10/2025		: ๖-239-๖-0038
SAMPLE CONDITION	: ดำขุ่น	FILE CODE	: 225003_WW_October

PARAMETER	UNIT	ANALYSIS METHODS	ND	STATION
			(non-detectable)	API Separator Effluent
Temperature	°C	2550 B	< 0.5	33.7
pH	-	4500-H ⁺ B	< 0.10	7.53
Total Dissolved Solids	mg/l	2540 C	< 25	1,092
Suspended Solids	mg/l	2540 D	< 2.5	126
Fat Oil & Grease	mg/l	5520 B	< 2.0	17.6
Phenols	mg/l	5530 B,D	< 0.10	0.21
Sulfide as H ₂ S	mg/l	4500-S ²⁻ F	< 0.20	ND
BOD ₅	mg/l	5210 B	< 1.0	60.0
COD	mg/l	5220 D	< 40.00	310
Chromium Trivalent (Cr ³⁺)	mg/l	3113 B/Calculation	< 0.001	0.004
Chromium Hexavalent (Cr ⁶⁺)	mg/l	3500-Cr B	< 0.01	ND
Mercury (Hg)	mg/l	3112 B	< 0.0005	0.0132

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

(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.	: 1886/68
SAMPLING BY	: SECOT Co., Ltd.	REGISTRATION No.	: -
SAMPLING DATE	: 03/10/2025	SAMPLING METHOD	: Grab
RECEIVED DATE	: 04/10/2025	SAMPLING TIME	: 10:24
ANALYTICAL DATE	: 04/10/2025	SITE OPERATOR	: Miss Wiraya Patchimboon
REPORT DATE	: 14/10/2025		: -
SAMPLE CONDITION	: ดำน้ำ	FILE CODE	: 225003_WW_October

PARAMETER	UNIT	ANALYSIS METHODS	ND (non-detectable)	STATION
				API Separator Effluent
Ammonia Nitrogen	mg/l	4500-NH ₃ B,C	< 0.02	1.3

REFERENCE : STANDARD METHODS FOR EXAMINATION OF WATER AND WASTEWATER 23rd 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.	: 2118/68
SAMPLING BY	: SECOT Co., Ltd.	REGISTRATION No.	: ๖-239
SAMPLING DATE	: 07/11/2025	SAMPLING METHOD	: Grab
RECEIVED DATE	: 08/11/2025	SAMPLING TIME	: 10:09
ANALYTICAL DATE	: 08-15/11/2025	SITE OPERATOR	: Mr. Baworn Deechaiya
REPORT DATE	: 15/11/2025		: ๖-239-๖-0005
SAMPLE CONDITION	: ดำน้ำ	FILE CODE	: 225003_WW_November

PARAMETER	UNIT	ANALYSIS METHODS	ND (non-detectable)	STATION
				API Separator Effluent
Temperature	°C	2550 B	< 0.5	34.5
pH	-	4500-H ⁺ B	< 0.10	7.23
Total Dissolved Solids	mg/l	2540 C	< 25	874
Suspended Solids	mg/l	2540 D	< 2.5	50
Fat Oil & Grease	mg/l	5520 B	< 2.0	30.1
Phenols	mg/l	5530 B,D	< 0.10	1.8
Sulfide as H ₂ S	mg/l	4500-S ²⁻ F	< 0.20	1.4
BOD ₅	mg/l	5210 B	< 1.0	83.4
COD	mg/l	5220 D	< 10.00	380
Chromium Trivalent (Cr ³⁺)	mg/l	3113 B/Calculation	< 0.001	ND
Chromium Hexavalent (Cr ⁶⁺)	mg/l	3500-Cr B	< 0.01	ND
Mercury (Hg)	mg/l	3112 B	< 0.0005	0.0167

REFERENCE : STANDARD METHODS FOR EXAMINATION OF WATER AND WASTEWATER 24th ED, 2023 (AWWA, APHA, WEF)

(Miss Khemchuda Insorn)

Analyst

REG. NO. ๖-239-๖-0005

(Mrs. Araya Tipparuk)

Technical Management Team

REG. NO. ๖-239-๖-0004

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WATER AND WASTEWATER ANALYSIS REPORT

CLIENT NAME	: Star Petroleum Refining Public Co., Ltd.	REQUEST SERVICE No.	: 2118/68
SAMPLING BY	: SECOT Co., Ltd.	REGISTRATION No.	: -
SAMPLING DATE	: 07/11/2025	SAMPLING METHOD	: Grab
RECEIVED DATE	: 08/11/2025	SAMPLING TIME	: 10:09
ANALYTICAL DATE	: 10/11/2025	SITE OPERATOR	: Mr. Baworn Deechaiya
REPORT DATE	: 15/11/2025		: -
SAMPLE CONDITION	: ดำเนิน	FILE CODE	: 225003_WW_November

PARAMETER	UNIT	ANALYSIS METHODS	ND (non-detectable)	STATION
				API Separator Effluent
Ammonia Nitrogen	mg/l	4500-NH ₃ B,C	< 0.02	6.0

REFERENCE : STANDARD METHODS FOR EXAMINATION OF WATER AND WASTEWATER 24th ED, 2023 (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.	: 2326/68
SAMPLING BY	: SECOT Co., Ltd.	REGISTRATION No.	: 2-239
SAMPLING DATE	: 04/12/2025	SAMPLING METHOD	: Grab
RECEIVED DATE	: 05/12/2025	SAMPLING TIME	: 09:54
ANALYTICAL DATE	: 05-17/12/2025	SITE OPERATOR	: Mr.Thanawut Duansaeng
REPORT DATE	: 18/12/2025		: 2-239-2-0031
SAMPLE CONDITION	: คำขุน	FILE CODE	: 225003_WW_December

PARAMETER	UNIT	ANALYSIS METHODS	ND (non-detectable)	STATION
				API Separator Effluent
Temperature	°C	2550 B	< 0.5	31.0
pH	-	4500-H ⁺ B	< 0.10	7.85
Total Dissolved Solids	mg/l	2540 C	< 25	656
Suspended Solids	mg/l	2540 D	< 2.5	126
Fat Oil & Grease	mg/l	5520 B	< 2.0	21.7
Phenols	mg/l	5530 B,D	< 0.10	1.9
Sulfide as H ₂ S	mg/l	4500-S ²⁻ F	< 0.20	1.6
BOD ₅	mg/l	5210 B	< 1.0	156
COD	mg/l	5220 D	< 10.00	330
Chromium Trivalent (Cr ³⁺)	mg/l	3113 B/Calculation	< 0.001	0.002
Chromium Hexavalent (Cr ⁶⁺)	mg/l	3500-Cr B	< 0.01	ND
Mercury (Hg)	mg/l	3112 B	< 0.0005	0.0234

REFERENCE : STANDARD METHODS FOR EXAMINATION OF WATER AND WASTEWATER 24th ED., 2023 (AWWA, APHA, WEF)

(Miss Khemchuda Insorn)

Analyst

REG. NO. 2-239-2-0005

(Mrs. Araya Tipparuk)

Technical Management Team

REG. NO. 2-239-2-0004

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WATER AND WASTEWATER ANALYSIS REPORT

CLIENT NAME	: Star Petroleum Refining Public Co., Ltd.	REQUEST SERVICE No.	: 2326/68
SAMPLING BY	: SECOT Co., Ltd.	REGISTRATION No.	: -
SAMPLING DATE	: 04/12/2025	SAMPLING METHOD	: Grab
RECEIVED DATE	: 05/12/2025	SAMPLING TIME	: 09:54
ANALYTICAL DATE	: 10/12/2025	SITE OPERATOR	: Mr.Thanawut Duansaeng
REPORT DATE	: 18/12/2025		: -
SAMPLE CONDITION	: ดำเนิน	FILE CODE	: 225003_WW_December

PARAMETER	UNIT	ANALYSIS METHODS	ND (non-detectable)	STATION
				API Separator Effluent
Ammonia Nitrogen	mg/l	4500-NH ₃ B,C	< 0.02	4.1

REFERENCE : STANDARD METHODS FOR EXAMINATION OF WATER AND WASTEWATER 24th ED. 2023 (AWWA, APHA, WEF)

Khemchuda Insorn

(Miss Khemchuda Insorn)

Analyst

Araya Tipparuk

(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.	: 1238/68
SAMPLING BY	: SECOT Co., Ltd.	REGISTRATION No.	: ๖-239
SAMPLING DATE	: 03/07/2025	SAMPLING METHOD	: Grab
RECEIVED DATE	: 04/07/2025	SAMPLING TIME	: 08:46
ANALYTICAL DATE	: 04-14/07/2025	SITE OPERATOR	: Mr. Jeerawat Khothamhan
REPORT DATE	: 15/07/2025	FILE CODE	: ๖-239-๖-0025
SAMPLE CONDITION	: เหลืองใสมีตะกอน		: 225003_WW_July

PARAMETER	UNIT	ANALYSIS METHODS	ND (non-detectable)	STATION
				IAF Unit Effluent
Temperature	°C	2550 B	< 0.5	32.5
pH	-	4500-H ⁺ B	< 0.10	8.84
Total Dissolved Solids	mg/l	2540 C	< 25	1,206
Suspended Solids	mg/l	2540 D	< 2.5	13
Fat Oil & Grease	mg/l	5520 B	< 2.0	ND
Phenols	mg/l	5530 B,D	< 0.10	0.69
Sulfide as H ₂ S	mg/l	4500-S ²⁻ F	< 0.20	0.16
BOD ₅	mg/l	5210 B	< 1.0	25.0
COD	mg/l	5220 D	< 10.00	121
Chromium Trivalent (Cr ³⁺)	mg/l	3113 B/Calculation	< 0.001	0.002
Chromium Hexavalent (Cr ⁶⁺)	mg/l	3500-Cr B	< 0.01	ND
Mercury (Hg)	mg/l	3112 B	< 0.0005	ND

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

(Miss Khemchuda Insorn)

Analyst

REG. NO. ๖-239-๖-0005

(Mrs. Araya Tipparuk)

Technical Management Team

REG. NO. ๖-239-๖-0004

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WATER AND WASTEWATER ANALYSIS REPORT

CLIENT NAME	: Star Petroleum Refining Public Co., Ltd.	REQUEST SERVICE No.	: 1238/68
SAMPLING BY	: SECOT Co., Ltd.	REGISTRATION No.	: -
SAMPLING DATE	: 03/07/2025	SAMPLING METHOD	: Grab
RECEIVED DATE	: 04/07/2025	SAMPLING TIME	: 08:46
ANALYTICAL DATE	: 04/07/2025	SITE OPERATOR	: Mr. Jeerawat Khothamhan
REPORT DATE	: 15/07/2025	FILE CODE	: 225003_WW_July
SAMPLE CONDITION	: เหลืองใสมีตะกอน		

PARAMETER	UNIT	ANALYSIS METHODS	ND (non-detectable)	STATION IAF Unit Effluent
Ammonia Nitrogen	mg/l	4500-NH ₃ B,C	< 0.02	4.9

REFERENCE : STANDARD METHODS FOR EXAMINATION OF WATER AND WASTEWATER 23rd 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.	: 1447/68
SAMPLING BY	: SECOT Co., Ltd.	REGISTRATION No.	: ๖-239
SAMPLING DATE	: 07/08/2025	SAMPLING METHOD	: Grab
RECEIVED DATE	: 08/08/2025	SAMPLING TIME	: 10:06
ANALYTICAL DATE	: 08-18/08/2025	SITE OPERATOR	: Mr. Baworn Deechaiya
REPORT DATE	: 18/08/2025		: ๖-239-๖-0005
SAMPLE CONDITION	: เหลืองใสมีตะกอน	FILE CODE	: 225003_WW_August

PARAMETER	UNIT	ANALYSIS METHODS	ND (non-detectable)	STATION
				IAF Unit Effluent
Temperature	°C	2550 B	< 0.5	35.4
pH	-	4500-H ⁺ B	< 0.10	7.20
Total Dissolved Solids	mg/l	2540 C	< 25	1,144
Suspended Solids	mg/l	2540 D	< 2.5	8.2
Fat Oil & Grease	mg/l	5520 B	< 2.0	ND
Phenols	mg/l	5530 B,D	< 0.10	0.14
Sulfide as H ₂ S	mg/l	4500-S ²⁻ F	< 0.20	0.23
BOD ₅	mg/l	5210 B	< 1.0	23.7
COD	mg/l	5220 D	< 40.00	80.92
Chromium Trivalent (Cr ³⁺)	mg/l	3113 B/Calculation	< 0.001	ND
Chromium Hexavalent (Cr ⁶⁺)	mg/l	3500-Cr B	< 0.01	ND
Mercury (Hg)	mg/l	3112 B	< 0.0005	0.0013

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

(Miss Khemchuda Insorn)

Analyst

REG. NO. ๖-239-๖-0005

(Mrs. Araya Tipparuk)

Technical Management Team

REG. NO. ๖-239-๖-0004

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WATER AND WASTEWATER ANALYSIS REPORT

CLIENT NAME	: Star Petroleum Refining Public Co., Ltd.	REQUEST SERVICE No.	: 1447/68
SAMPLING BY	: SECOT Co., Ltd.	REGISTRATION No.	: -
SAMPLING DATE	: 07/08/2025	SAMPLING METHOD	: Grab
RECEIVED DATE	: 08/08/2025	SAMPLING TIME	: 10:06
ANALYTICAL DATE	: 11/08/2028	SITE OPERATOR	: Mr. Baworn Deechaiya
REPORT DATE	: 18/08/2025		: -
SAMPLE CONDITION	: เหลืองใสมีตะกอน	FILE CODE	: 225003_WW_August

PARAMETER	UNIT	ANALYSIS	ND	STATION
		METHODS	(non-detectable)	IAF Unit Effluent
Ammonia Nitrogen	mg/l	4500-NH ₃ B,C	< 0.02	4.6

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

(Miss Khemchuda Insorn)

Analyst

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WATER AND WASTEWATER ANALYSIS REPORT

CLIENT NAME	: Star Petroleum Refining Public Co., Ltd.	REQUEST SERVICE No.	: 1670/68
SAMPLING BY	: SECOT Co., Ltd.	REGISTRATION No.	: ๖-239
SAMPLING DATE	: 04/09/2025	SAMPLING METHOD	: Grab
RECEIVED DATE	: 05/09/2025	SAMPLING TIME	: 09:21
ANALYTICAL DATE	: 05-15/09/2025	SITE OPERATOR	: Mr.Tanachot Changlor
REPORT DATE	: 17/09/2025	FILE CODE	: ๖-239-๖-0020
SAMPLE CONDITION	: เหลืองปูน		: 225003_WW_September

PARAMETER	UNIT	ANALYSIS METHODS	ND (non-detectable)	STATION
				IAF Unit Effluent
Temperature	"C	2550 B	< 0.5	34.6
pH		4500-H ⁺ B	< 0.10	6.81
Total Dissolved Solids	mg/l	2540 C	< 25	1,288
Suspended Solids	mg/l	2540 D	< 2.5	10
Fat Oil & Grease	mg/l	5520 B	< 2.0	ND
Phenols	mg/l	5530 B,D	< 0.10	0.42
Sulfide as H ₂ S	mg/l	4500-S ²⁻ F	< 0.20	ND
BOD ₅	mg/l	5210 B	< 1.0	12.1
COD	mg/l	5220 D	< 40.00	111
Chromium Trivalent (Cr ³⁺)	mg/l	3113 B/Calculation	< 0.001	0.003
Chromium Hexavalent (Cr ⁶⁺)	mg/l	3500-Cr B	< 0.01	ND
Mercury (Hg)	mg/l	3112 B	< 0.0005	ND

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

(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.	: 1670/68
SAMPLING BY	: SECOT Co., Ltd.	REGISTRATION No.	: -
SAMPLING DATE	: 04/09/2025	SAMPLING METHOD	: Grab
RECEIVED DATE	: 05/09/2025	SAMPLING TIME	: 09:21
ANALYTICAL DATE	: 12/09/2028	SITE OPERATOR	: Mr.Tanachot Changlor
REPORT DATE	: 17/09/2025		: -
SAMPLE CONDITION	: เหลืองขุ่น	FILE CODE	: 225003_WW_September

PARAMETER	UNIT	ANALYSIS METHODS	ND (non-detectable)	STATION
				IAF Unit Effluent
Ammonia Nitrogen	mg/l	4500-NH ₃ B,C	< 0.02	5.2

REFERENCE : STANDARD METHODS FOR EXAMINATION OF WATER AND WASTEWATER 23rd 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.	: 1886/68
SAMPLING BY	: SECOT Co., Ltd.	REGISTRATION No.	: ๓-239
SAMPLING DATE	: 03/10/2025	SAMPLING METHOD	: Grab
RECEIVED DATE	: 04/10/2025	SAMPLING TIME	: 10:17
ANALYTICAL DATE	: 04-14/10/2025	SITE OPERATOR	: Miss Wiraya Patchimboon
REPORT DATE	: 14/10/2025		: ๓-239-๓-0038
SAMPLE CONDITION	: เหลือจุ่ม	FILE CODE	: 225003_WW_October

PARAMETER	UNIT	ANALYSIS METHODS	ND (non-detectable)	STATION
				IAF Unit Effluent
Temperature	°C	2550 B	< 0.5	34.5
pH	-	4500-H ⁺ B	< 0.10	7.55
Total Dissolved Solids	mg/l	2540 C	< 25	1,044
Suspended Solids	mg/l	2540 D	< 2.5	14
Fat Oil & Grease	mg/l	5520 B	< 2.0	ND
Phenols	mg/l	5530 B,D	< 0.10	0.16
Sulfide as H ₂ S	mg/l	4500-S ²⁻ F	< 0.20	ND
BOD ₅	mg/l	5210 B	< 1.0	13.0
COD	mg/l	5220 D	< 40.00	72.25
Chromium Trivalent (Cr ³⁺)	mg/l	3113 B/Calculation	< 0.001	ND
Chromium Hexavalent (Cr ⁶⁺)	mg/l	3500-Cr B	< 0.01	ND
Mercury (Hg)	mg/l	3112 B	< 0.0005	0.0014

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



(Miss Khemchuda Insorn)

Analyst

REG. NO. ๓-239-๓-0005



(Mrs. Araya Tipparuk)

Technical Management Team

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WATER AND WASTEWATER ANALYSIS REPORT

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SAMPLING BY	: SECOT Co., Ltd.	REGISTRATION No.	: -
SAMPLING DATE	: 03/10/2025	SAMPLING METHOD	: Grab
RECEIVED DATE	: 04/10/2025	SAMPLING TIME	: 10:17
ANALYTICAL DATE	: 04/10/2025	SITE OPERATOR	: Miss Wiraya Patchimboon
REPORT DATE	: 14/10/2025		: -
SAMPLE CONDITION	: เหลืองขุ่น	FILE CODE	: 225003_WW_October

PARAMETER	UNIT	ANALYSIS METHODS	ND (non-detectable)	STATION
				IAF Unit Effluent
Ammonia Nitrogen	mg/l	4500-NH ₃ B,C	< 0.02	1.9

REFERENCE : STANDARD METHODS FOR EXAMINATION OF WATER AND WASTEWATER 23rd 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.	: 2118/68
SAMPLING BY	: SECOT Co., Ltd.	REGISTRATION No.	: ๓-239
SAMPLING DATE	: 07/11/2025	SAMPLING METHOD	: Grab
RECEIVED DATE	: 08/11/2025	SAMPLING TIME	: 15:04
ANALYTICAL DATE	: 08-15/11/2025	SITE OPERATOR	: Mr. Baworn Deechaiya
REPORT DATE	: 15/11/2025		: ๓-239-๓-0005
SAMPLE CONDITION	: เหลืองมีตะกอน	FILE CODE	: 225003_WW_November

PARAMETER	UNIT	ANALYSIS METHODS	ND (non-detectable)	STATION
				IAF Unit Effluent
Temperature	°C	2550 B	< 0.5	34.6
pH	-	4500-H ⁺ B	< 0.10	7.09
Total Dissolved Solids	mg/l	2540 C	< 25	1,100
Suspended Solids	mg/l	2540 D	< 2.5	25
Fat Oil & Grease	mg/l	5520 B	< 2.0	ND
Phenols	mg/l	5530 B,D	< 0.10	1.4
Sulfide as H ₂ S	mg/l	4500-S ²⁻ F	< 0.20	0.38
BOD ₅	mg/l	5210 B	< 1.0	35.8
COD	mg/l	5220 D	< 10.00	207
Chromium Trivalent (Cr ³⁺)	mg/l	3113 B/Calculation	< 0.001	ND
Chromium Hexavalent (Cr ⁶⁺)	mg/l	3500-Cr B	< 0.01	ND
Mercury (Hg)	mg/l	3112 B	< 0.0005	0.0036

REFERENCE : STANDARD METHODS FOR EXAMINATION OF WATER AND WASTEWATER 24th ED. 2023 (AWWA,APHA, WEF)



(Miss Khemchuda Insorn)

Analyst

REG. NO. ๓-239-๓-0005



(Mrs. Araya Tipparuk)

Technical Management Team

REG. NO. ๓-239-๓-0004

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WATER AND WASTEWATER ANALYSIS REPORT

CLIENT NAME	: Star Petroleum Refining Public Co., Ltd.	REQUEST SERVICE No.	: 2118/68
SAMPLING BY	: SECOT Co., Ltd.	REGISTRATION No.	: -
SAMPLING DATE	: 07/11/2025	SAMPLING METHOD	: Grab
RECEIVED DATE	: 08/11/2025	SAMPLING TIME	: 15:04
ANALYTICAL DATE	: 10/11/2025	SITE OPERATOR	: Mr. Baworn Deechaiya
REPORT DATE	: 15/11/2025		: -
SAMPLE CONDITION	: เหลืองมีตะกอน	FILE CODE	: 225003_WW_November

PARAMETER	UNIT	ANALYSIS METHODS	ND (non-detectable)	STATION
				IAF Unit Effluent
Ammonia Nitrogen	mg/l	4500-NH ₃ B,C	< 0.02	6.0

REFERENCE : STANDARD METHODS FOR EXAMINATION OF WATER AND WASTEWATER 24th ED., 2023 (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.	: 2326/68
SAMPLING BY	: SECOT Co., Ltd.	REGISTRATION No.	: ๖-239
SAMPLING DATE	: 04/12/2025	SAMPLING METHOD	: Grab
RECEIVED DATE	: 05/12/2025	SAMPLING TIME	: 09:42
ANALYTICAL DATE	: 05-17/12/2025	SITE OPERATOR	: Mr.Thanawut Duansaeng
REPORT DATE	: 18/12/2025		: ๖-239-๓-0031
SAMPLE CONDITION	: เหลืองใสมีตะกอน	FILE CODE	: 225003_WW_December

PARAMETER	UNIT	ANALYSIS METHODS	ND (non-detectable)	STATION
				IAF Unit Effluent
Temperature	°C	2550 B	< 0.5	33.1
pH	-	4500-H ⁺ B	< 0.10	7.34
Total Dissolved Solids	mg/l	2540 C	< 25	660
Suspended Solids	mg/l	2540 D	< 2.5	14
Fat Oil & Grease	mg/l	5520 B	< 2.0	ND
Phenols	mg/l	5530 B,D	< 0.10	1.7
Sulfide as H ₂ S	mg/l	4500-S ²⁻ F	< 0.20	0.71
BOD ₅	mg/l	5210 B	< 1.0	34.4
COD	mg/l	5220 D	< 10.00	103
Chromium Trivalent (Cr ³⁺)	mg/l	3113 B/Calculation	< 0.001	ND
Chromium Hexavalent (Cr ⁶⁺)	mg/l	3500-Cr B	< 0.01	ND
Mercury (Hg)	mg/l	3112 B	< 0.0005	0.0020

REFERENCE : STANDARD METHODS FOR EXAMINATION OF WATER AND WASTEWATER 24th ED. 2023 (AWWA, APHA, WEF)

Khemchuda Insorn

(Miss Khemchuda Insorn)

Analyst

REG. NO. ๖-239-๓-0005

Araya Tipparuk

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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.	: 2326/68
SAMPLING BY	: SECOT Co., Ltd.	REGISTRATION No.	: -
SAMPLING DATE	: 04/12/2025	SAMPLING METHOD	: Grab
RECEIVED DATE	: 05/12/2025	SAMPLING TIME	: 09:42
ANALYTICAL DATE	: 10/12/2025	SITE OPERATOR	: Mr.Thanawut Duansaeng
REPORT DATE	: 18/12/2025		: -
SAMPLE CONDITION	: เหลืองใสมีตะกอน	FILE CODE	: 225003_WW_December

PARAMETER	UNIT	ANALYSIS METHODS	ND (non-detectable)	STATION
				IAF Unit Effluent
Ammonia Nitrogen	mg/l	4500-NH ₃ B,C	< 0.02	4.2

REFERENCE : STANDARD METHODS FOR EXAMINATION OF WATER AND WASTEWATER 24th ED. 2023 (AWWA, APHA, WEF)

Khemchuda Insorn

(Miss Khemchuda Insorn)

Analyst

Araya Tipparuk

(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.	: 1238/68
SAMPLING BY	: SECOT Co., Ltd.	REGISTRATION No.	: 1-239
SAMPLING DATE	: 03/07/2025	SAMPLING METHOD	: Grab
RECEIVED DATE	: 04/07/2025	SAMPLING TIME	: 09:03
ANALYTICAL DATE	: 04-14/07/2025	SITE OPERATOR	: Mr. Jeerawat Khothamhan
REPORT DATE	: 15/07/2025	FILE CODE	: 225003_WW_July
SAMPLE CONDITION	: ดำมีตะกอน		

PARAMETER	UNIT	ANALYSIS METHODS	ND (non-detectable)	STATION
				Equalization Tank Effluent
Temperature	°C	2550 B	< 0.5	32.3
pH	-	4500-H ⁺ B	< 0.10	10.00
Total Dissolved Solids	mg/l	2540 C	< 25	1,174
Suspended Solids	mg/l	2540 D	< 2.5	17
Fat Oil & Grease	mg/l	5520 B	< 2.0	ND
Phenols	mg/l	5530 B,D	< 0.10	2.3
Sulfide as H ₂ S	mg/l	4500-S ²⁻ F	< 0.20	5.4
BOD ₅	mg/l	5210 B	< 1.0	88.4
COD	mg/l	5220 D	< 10.00	290
Chromium Trivalent (Cr ³⁺)	mg/l	3113 B/Calculation	< 0.001	ND
Chromium Hexavalent (Cr ⁶⁺)	mg/l	3500-Cr B	< 0.01	ND
Mercury (Hg)	mg/l	3112 B	< 0.0005	0.0006

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

(Miss Khemchuda Insorn)

Analyst

REG. NO. 1-239-ค-0005

(Mrs. Araya Tipparuk)

Technical Management Team

REG. NO. 1-239-ค-0004

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WATER AND WASTEWATER ANALYSIS REPORT

CLIENT NAME	: Star Petroleum Refining Public Co., Ltd.	REQUEST SERVICE No.	: 1238/68
SAMPLING BY	: SECOT Co., Ltd.	REGISTRATION No.	: -
SAMPLING DATE	: 03/07/2025	SAMPLING METHOD	: Grab
RECEIVED DATE	: 04/07/2025	SAMPLING TIME	: 09:03
ANALYTICAL DATE	: 04/07/2025	SITE OPERATOR	: Mr. Jeerawat Khothamhan
REPORT DATE	: 15/07/2025		: -
SAMPLE CONDITION	: คำมีตะกอน	FILE CODE	: 225003_WW_July

PARAMETER	UNIT	ANALYSIS METHODS	ND (non-detectable)	STATION Equalization Tank Effluent
Ammonia Nitrogen	mg/l	4500-NH ₃ B,C	< 0.02	12.8

REFERENCE : STANDARD METHODS FOR EXAMINATION OF WATER AND WASTEWATER 23rd 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.	: 1447/68
SAMPLING BY	: SECOT Co., Ltd.	REGISTRATION No.	: ๖-239
SAMPLING DATE	: 07/08/2025	SAMPLING METHOD	: Grab
RECEIVED DATE	: 08/08/2025	SAMPLING TIME	: 9:34
ANALYTICAL DATE	: 08-18/08/2025	SITE OPERATOR	: Mr. Baworn Deechaiya
REPORT DATE	: 18/08/2025		: ๖-239-๖-0005
SAMPLE CONDITION	: เหลือของขึ้น	FILE CODE	: 225003_WW_August

PARAMETER	UNIT	ANALYSIS	ND	STATION
		METHODS	(non-detectable)	Equalization Tank Effluent
Temperature	°C	2550 B	< 0.5	33.9
pH		4500-H ⁺ B	< 0.10	9.13
Total Dissolved Solids	mg/l	2540 C	< 25	1,100
Suspended Solids	mg/l	2540 D	< 2.5	8.0
Fat Oil & Grease	mg/l	5520 B	< 2.0	ND
Phenols	mg/l	5530 B,D	< 0.10	0.59
Sulfide as H ₂ S	mg/l	4500-S ²⁻ F	< 0.20	1.3
BOD ₅	mg/l	5210 B	< 1.0	35.2
COD	mg/l	5220 D	< 40.00	130
Chromium Trivalent (Cr ³⁺)	mg/l	3113 B/Calculation	< 0.001	ND
Chromium Hexavalent (Cr ⁶⁺)	mg/l	3500-Cr B	< 0.01	ND
Mercury (Hg)	mg/l	3112 B	< 0.0005	0.0006

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

Khemchuda Insorn

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Analyst

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Araya Tipparuk

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Technical Management Team

REG. NO. ๖-239-๖-0004

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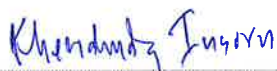
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WATER AND WASTEWATER ANALYSIS REPORT

CLIENT NAME	: Star Petroleum Refining Public Co., Ltd.	REQUEST SERVICE No.	: 1447/68
SAMPLING BY	: SECOT Co., Ltd.	REGISTRATION No.	: -
SAMPLING DATE	: 07/08/2025	SAMPLING METHOD	: Grab
RECEIVED DATE	: 08/08/2025	SAMPLING TIME	: 9:34
ANALYTICAL DATE	: 11/08/2028	SITE OPERATOR	: Mr. Baworn Deechaiya
REPORT DATE	: 18/08/2025		: -
SAMPLE CONDITION	: เหลืองขุ่น	FILE CODE	: 225003_WW_August

PARAMETER	UNIT	ANALYSIS	ND	STATION
		METHODS	(non-detectable)	Equalization Tank Effluent
Ammonia Nitrogen	mg/l	4500-NH ₃ B,C	< 0.02	4.5

REFERENCE : STANDARD METHODS FOR EXAMINATION OF WATER AND WASTEWATER 23rd 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.	: 1670/68
SAMPLING BY	: SECOT Co., Ltd.	REGISTRATION No.	: ๖-239
SAMPLING DATE	: 04/09/2025	SAMPLING METHOD	: Grab
RECEIVED DATE	: 05/09/2025	SAMPLING TIME	: 09:14
ANALYTICAL DATE	: 05-15/09/2025	SITE OPERATOR	: Mr.Tanachot Changlor
REPORT DATE	: 17/09/2025		: ๖-239-๓-0020
SAMPLE CONDITION	: เหลือongan	FILE CODE	: 225003_WW_September

PARAMETER	UNIT	ANALYSIS METHODS	ND (non-detectable)	STATION
				Equalization Tank Effluent
Temperature	°C	2550 B	< 0.5	33.8
pH		4500-H ⁺ B	< 0.10	9.49
Total Dissolved Solids	mg/l	2540 C	< 25	1,392
Suspended Solids	mg/l	2540 D	< 2.5	5.6
Fat Oil & Grease	mg/l	5520 B	< 2.0	2.4
Phenols	mg/l	5530 B,D	< 0.10	1.4
Sulfide as H ₂ S	mg/l	4500-S ²⁻ F	< 0.20	4.7
BOD ₅	mg/l	5210 B	< 1.0	50.9
COD	mg/l	5220 D	< 40.00	221
Chromium Trivalent (Cr ³⁺)	mg/l	3113 B/Calculation	< 0.001	0.002
Chromium Hexavalent (Cr ⁶⁺)	mg/l	3500-Cr B	< 0.01	ND
Mercury (Hg)	mg/l	3112 B	< 0.0005	0.0005

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

(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.	: 1670/68
SAMPLING BY	: SECOT Co., Ltd.	REGISTRATION No.	: -
SAMPLING DATE	: 04/09/2025	SAMPLING METHOD	: Grab
RECEIVED DATE	: 05/09/2025	SAMPLING TIME	: 09:14
ANALYTICAL DATE	: 12/09/2028	SITE OPERATOR	: Mr.Tanachot Changlor
REPORT DATE	: 17/09/2025		: -
SAMPLE CONDITION	: เหลืองขุ่น	FILE CODE	: 225003_WW_September

PARAMETER	UNIT	ANALYSIS METHODS	ND (non-detectable)	STATION
				Equalization Tank Effluent
Ammonia Nitrogen	mg/l	4500-NH ₃ B,C	< 0.02	9.1

REFERENCE : STANDARD METHODS FOR EXAMINATION OF WATER AND WASTEWATER 23rd 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.	: 1886/68
SAMPLING BY	: SECOT Co., Ltd.	REGISTRATION No.	: ๓-239
SAMPLING DATE	: 03/10/2025	SAMPLING METHOD	: Grab
RECEIVED DATE	: 04/10/2025	SAMPLING TIME	: 10:09
ANALYTICAL DATE	: 04-14/10/2025	SITE OPERATOR	: Miss Wiraya Patchimboon
REPORT DATE	: 14/10/2025	FILE CODE	: ๓-239-๓-0038
SAMPLE CONDITION	: เหลือผง		: 225003_WW_October

PARAMETER	UNIT	ANALYSIS METHODS	ND (non-detectable)	STATION
				Equalization Tank Effluent
Temperature	"C	2550 B	< 0.5	34.6
pH	-	4500-H ⁺ B	< 0.10	10.10
Total Dissolved Solids	mg/l	2540 C	< 25	1,088
Suspended Solids	mg/l	2540 D	< 2.5	< 2.5
Fat Oil & Grease	mg/l	5520 B	< 2.0	2.4
Phenols	mg/l	5530 B,D	< 0.10	3.2
Sulfide as H ₂ S	mg/l	4500-S ²⁻ F	< 0.20	1.0
BOD ₅	mg/l	5210 B	< 1.0	58.7
COD	mg/l	5220 D	< 40.00	345
Chromium Trivalent (Cr ³⁺)	mg/l	3113 B/Calculation	< 0.001	ND
Chromium Hexavalent (Cr ⁶⁺)	mg/l	3500-Cr B	< 0.01	ND
Mercury (Hg)	mg/l	3112 B	< 0.0005	0.0018

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

(Miss Khemchuda Insorn)

Analyst

REG. NO. ๓-239-๓-0005

(Mrs. Araya Tipparuk)

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WATER AND WASTEWATER ANALYSIS REPORT

CLIENT NAME	: Star Petroleum Refining Public Co., Ltd.	REQUEST SERVICE No.	: 1886/68
SAMPLING BY	: SECOT Co., Ltd.	REGISTRATION No.	: -
SAMPLING DATE	: 03/10/2025	SAMPLING METHOD	: Grab
RECEIVED DATE	: 04/10/2025	SAMPLING TIME	: 10:09
ANALYTICAL DATE	: 04/10/2025	SITE OPERATOR	: Miss Wiraya Patchimboon
REPORT DATE	: 14/10/2025		: -
SAMPLE CONDITION	: เหลือขุ่น	FILE CODE	: 225003_WW_October

PARAMETER	UNIT	ANALYSIS METHODS	ND (non-detectable)	STATION
				Equalization Tank Effluent
Ammonia Nitrogen	mg/l	4500-NH ₃ B,C	< 0.02	5.0

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

(Miss Khemchuda Insorn)

Analyst

(Mrs. Araya Tipparuk)

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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.	: 2118/68
SAMPLING BY	: SECOT Co., Ltd.	REGISTRATION No.	: ๓-239
SAMPLING DATE	: 07/11/2025	SAMPLING METHOD	: Grab
RECEIVED DATE	: 08/11/2025	SAMPLING TIME	: 09:56
ANALYTICAL DATE	: 08-15/11/2025	SITE OPERATOR	: Mr. Baworn Deechaiya
REPORT DATE	: 15/11/2025		: ๓-239-๓-0005
SAMPLE CONDITION	: ดำน้ำ	FILE CODE	: 225003_WW_November

PARAMETER	UNIT	ANALYSIS METHODS	ND (non-detectable)	STATION
				Equalization Tank Effluent
Temperature	°C	2550 B	< 0.5	33.6
pH	-	4500-H ⁺ B	< 0.10	9.68
Total Dissolved Solids	mg/l	2540 C	< 25	1,122
Suspended Solids	mg/l	2540 D	< 2.5	251
Fat Oil & Grease	mg/l	5520 B	< 2.0	16.4
Phenols	mg/l	5530 B,D	< 0.10	3.0
Sulfide as H ₂ S	mg/l	4500-S ²⁻ F	< 0.20	1.7
BOD ₅	mg/l	5210 B	< 1.0	84.5
COD	mg/l	5220 D	< 10.00	434
Chromium Trivalent (Cr ³⁺)	mg/l	3113 B/Calculation	< 0.001	0.010
Chromium Hexavalent (Cr ⁶⁺)	mg/l	3500-Cr B	< 0.01	ND
Mercury (Hg)	mg/l	3112 B	< 0.0005	0.0385

REFERENCE : STANDARD METHODS FOR EXAMINATION OF WATER AND WASTEWATER 24th ED. 2023 (AWWA, APHA, WEF)

(Miss Khemchuda Insorn)

Analyst

REG. NO. ๓-239-๓-0005

(Mrs. Araya Tipparuk)

Technical Management Team

REG. NO. ๓-239-๓-0004

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

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WATER AND WASTEWATER ANALYSIS REPORT

CLIENT NAME	: Star Petroleum Refining Public Co., Ltd.	REQUEST SERVICE No.	: 2118/68
SAMPLING BY	: SECOT Co., Ltd.	REGISTRATION No.	: -
SAMPLING DATE	: 07/11/2025	SAMPLING METHOD	: Grab
RECEIVED DATE	: 08/11/2025	SAMPLING TIME	: 09:56
ANALYTICAL DATE	: 10/11/2025	SITE OPERATOR	: Mr. Baworn Deechaiya
REPORT DATE	: 15/11/2025		: -
SAMPLE CONDITION	: ค้างุ่น	FILE CODE	: 225003_WW_November

PARAMETER	UNIT	ANALYSIS METHODS	ND (non-detectable)	STATION
				Equalization Tank Effluent
Ammonia Nitrogen	mg/l	4500-NH ₃ B,C	< 0.02	5.3

REFERENCE: STANDARD METHODS FOR EXAMINATION OF WATER AND WASTEWATER 24th ED. 2023 (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.	: 2326/68
SAMPLING BY	: SECOT Co., Ltd.	REGISTRATION No.	: ๖-239
SAMPLING DATE	: 04/12/2025	SAMPLING METHOD	: Grab
RECEIVED DATE	: 05/12/2025	SAMPLING TIME	: 09:24
ANALYTICAL DATE	: 05-17/12/2025	SITE OPERATOR	: Mr.Thanawut Duansaeng
REPORT DATE	: 18/12/2025		: ๖-239-๓-0031
SAMPLE CONDITION	: ดำขุ่น	FILE CODE	: 225003_WW_December

PARAMETER	UNIT	ANALYSIS METHODS	ND (non-detectable)	STATION
				Equalization Tank Effluent
Temperature	°C	2550 B	< 0.5	31.5
pH	-	4500-H ⁺ B	< 0.10	10.02
Total Dissolved Solids	mg/l	2540 C	< 25	1,165
Suspended Solids	mg/l	2540 D	< 2.5	171
Fat Oil & Grease	mg/l	5520 B	< 2.0	8.0
Phenols	mg/l	5530 B,D	< 0.10	5.4
Sulfide as H ₂ S	mg/l	4500-S ²⁻ F	< 0.20	3.2
BOD ₅	mg/l	5210 B	< 1.0	80.8
COD	mg/l	5220 D	< 10.00	257
Chromium Trivalent (Cr ³⁺)	mg/l	3113 B/Calculation	< 0.001	ND
Chromium Hexavalent (Cr ⁶⁺)	mg/l	3500-Cr B	< 0.01	ND
Mercury (Hg)	mg/l	3112 B	< 0.0005	0.0185

REFERENCE : STANDARD METHODS FOR EXAMINATION OF WATER AND WASTEWATER 24th ED., 2023 (AWWA,APHA, WEF)

Khemchuda Insorn

(Miss Khemchuda Insorn)

Analyst

REG. NO. ๖-239-๓-0005

Araya Tippiaruk

(Mrs. Araya Tippiaruk)

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.	: 2326/68
SAMPLING BY	: SECOT Co., Ltd.	REGISTRATION No.	: -
SAMPLING DATE	: 04/12/2025	SAMPLING METHOD	: Grab
RECEIVED DATE	: 05/12/2025	SAMPLING TIME	: 09:24
ANALYTICAL DATE	: 10/12/2025	SITE OPERATOR	: Mr.Thanawut Duansaeng
REPORT DATE	: 18/12/2025		: -
SAMPLE CONDITION	: คำขุน	FILE CODE	: 225003_WW_December

PARAMETER	UNIT	ANALYSIS METHODS	ND (non-detectable)	STATION
				Equalization Tank Effluent
Ammonia Nitrogen	mg/l	4500-NH ₃ B,C	< 0.02	8.4

REFERENCE : STANDARD METHODS FOR EXAMINATION OF WATER AND WASTEWATER 24th ED., 2023 (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.	: 1238/68
SAMPLING BY	: SECOT Co., Ltd.	REGISTRATION No.	: ๓-239
SAMPLING DATE	: 03/07/2025	SAMPLING METHOD	: Grab
RECEIVED DATE	: 04/07/2025	SAMPLING TIME	: 09:15
ANALYTICAL DATE	: 04-14/07/2025	SITE OPERATOR	: Mr. Jeerawat Khothamhan
REPORT DATE	: 15/07/2025		: ๓-239-๓-0025
SAMPLE CONDITION	: เหลืองใส	FILE CODE	: 225003_WW_July

PARAMETER	UNIT	ANALYSIS METHODS	ND	STATION
			(non-detectable)	Biological Treatment Effluent
Temperature	°C	2550 B	< 0.5	33.1
pH	-	4500-H ⁺ B	< 0.10	7.55
Total Dissolved Solids	mg/l	2540 C	< 25	1,250
Suspended Solids	mg/l	2540 D	< 2.5	4.0
Fat Oil & Grease	mg/l	5520 B	< 2.0	ND
Phenols	mg/l	5530 B,C	< 0.001	ND*
Sulfide as H ₂ S	mg/l	4500-S ²⁻ F	< 0.20	ND
BOD ₅	mg/l	5210 B	< 1.0	< 1.0
COD	mg/l	5220 D	< 10.00	< 40.00
Chromium Trivalent (Cr ³⁺)	mg/l	3113 B/Calculation	< 0.001	ND
Chromium Hexavalent (Cr ⁶⁺)	mg/l	3500-Cr B	< 0.01	ND
Mercury (Hg)	mg/l	3112 B	< 0.0005	ND

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

(Miss Khemchuda Insorn)

Analyst

REG. NO. ๓-239-๓-0005

(Mrs. Araya Tipparuk)

Technical Management Team

REG. NO. ๓-239-๓-0004

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WATER AND WASTEWATER ANALYSIS REPORT

CLIENT NAME	: Star Petroleum Refining Public Co., Ltd.	REQUEST SERVICE No.	: 1238/68
SAMPLING BY	: SECOT Co., Ltd.	REGISTRATION No.	: -
SAMPLING DATE	: 03/07/2025	SAMPLING METHOD	: Grab
RECEIVED DATE	: 04/07/2025	SAMPLING TIME	: 09:15
ANALYTICAL DATE	: 04/07/2025	SITE OPERATOR	: Mr. Jeerawat Khothamhan
REPORT DATE	: 15/07/2025		: -
SAMPLE CONDITION	: เหลืองใส	FILE CODE	: 225003_WW_July

PARAMETER	UNIT	ANALYSIS METHODS	ND (non-detectable)	STATION
				Biological Treatment Effluent
Ammonia Nitrogen	mg/l	Method 350.2	< 0.02	0.10*

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

(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.	: 1447/68
SAMPLING BY	: SECOT Co., Ltd.	REGISTRATION No.	: ว-239
SAMPLING DATE	: 07/08/2025	SAMPLING METHOD	: Grab
RECEIVED DATE	: 08/08/2025	SAMPLING TIME	: 9:16
ANALYTICAL DATE	: 08-18/08/2025	SITE OPERATOR	: Mr. Baworn Deechaiya
REPORT DATE	: 18/08/2025		: ว-239-จ-0005
SAMPLE CONDITION	: เหลืองใส	FILE CODE	: 225003_WW_August

PARAMETER	UNIT	ANALYSIS	ND	STATION
		METHODS	(non-detectable)	Biological Treatment Effluent
Temperature	"C	2550 B	< 0.5	32.5
pH		4500-H ⁺ B	< 0.10	7.76
Total Dissolved Solids	mg/l	2540 C	< 25	1,274
Suspended Solids	mg/l	2540 D	< 2.5	9.3
Fat Oil & Grease	mg/l	5520 B	< 2.0	ND
Phenols	mg/l	5530 B,C	< 0.001	ND
Sulfide as H ₂ S	mg/l	4500-S ²⁻ F	< 0.20	ND
BOD ₅	mg/l	5210 B	< 1.0	< 1.0
COD	mg/l	5220 D	< 40.00	< 40.00
Chromium Trivalent (Cr ³⁺)	mg/l	3113 B/Calculation	< 0.001	ND
Chromium Hexavalent (Cr ⁶⁺)	mg/l	3500-Cr B	< 0.01	ND
Mercury (Hg)	mg/l	3112 B	< 0.0005	0.0007

REFERENCE : STANDARD METHODS FOR EXAMINATION OF WATER AND WASTEWATER 23rd 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-จ-0005

(Mrs. Araya Tipparuk)

Technical Management Team

REG. NO. ว-239-จ-0004

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WATER AND WASTEWATER ANALYSIS REPORT

CLIENT NAME	: Star Petroleum Refining Public Co., Ltd.	REQUEST SERVICE No.	: 1447/68
SAMPLING BY	: SECOT Co., Ltd.	REGISTRATION No.	: -
SAMPLING DATE	: 07/08/2025	SAMPLING METHOD	: Grab
RECEIVED DATE	: 08/08/2025	SAMPLING TIME	: 9:16
ANALYTICAL DATE	: 11/08/2028	SITE OPERATOR	: Mr. Baworn Deechaiya
REPORT DATE	: 18/08/2025		: -
SAMPLE CONDITION	: เหลืองใส	FILE CODE	: 225003_WW_August

PARAMETER	UNIT	ANALYSIS	ND	STATION
		METHODS	(non-detectable)	Biological Treatment Effluent
Ammonia Nitrogen	mg/l	Method 350.2	< 0.02	0.06

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

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Technical Management Team

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WATER AND WASTEWATER ANALYSIS REPORT

CLIENT NAME	: Star Petroleum Refining Public Co., Ltd.	REQUEST SERVICE No.	: 1670/68
SAMPLING BY	: SECOT Co., Ltd.	REGISTRATION No.	: ๓-239
SAMPLING DATE	: 04/09/2025	SAMPLING METHOD	: Grab
RECEIVED DATE	: 05/09/2025	SAMPLING TIME	: 09:05
ANALYTICAL DATE	: 05-15/09/2025	SITE OPERATOR	: Mr.Tanachot Changlor
REPORT DATE	: 17/09/2025		: ๓-239-๓-0020
SAMPLE CONDITION	: เหลืองใส	FILE CODE	: 225003_WW_September

PARAMETER	UNIT	ANALYSIS METHODS	ND (non-detectable)	STATION
				Biological Treatment Effluent
Temperature	"C	2550 B	< 0.5	33.5
pH	-	4500-H ⁺ B	< 0.10	7.13
Total Dissolved Solids	mg/l	2540 C	< 25	1,260
Suspended Solids	mg/l	2540 D	< 2.5	3.2
Fat Oil & Grease	mg/l	5520 B	< 2.0	ND
Phenols	mg/l	5530 B,C	< 0.001	ND
Sulfide as H ₂ S	mg/l	4500-S ²⁻ F	< 0.20	ND
BOD ₅	mg/l	5210 B	< 1.0	< 1.0
COD	mg/l	5220 D	< 40.00	< 40.00
Chromium Trivalent (Cr ³⁺)	mg/l	3113 B/Calculation	< 0.001	ND
Chromium Hexavalent (Cr ⁶⁺)	mg/l	3500-Cr B	< 0.01	ND
Mercury (Hg)	mg/l	3112 B	< 0.0005	ND

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



(Miss Khemchuda Insorn)

Analyst

REG. NO. ๓-239-๓-0005



(Mrs. Araya Tipparuk)

Technical Management Team

REG. NO. ๓-239-๓-0004

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WATER AND WASTEWATER ANALYSIS REPORT

CLIENT NAME	: Star Petroleum Refining Public Co., Ltd.	REQUEST SERVICE No.	: 1670/68
SAMPLING BY	: SECOT Co., Ltd.	REGISTRATION No.	: -
SAMPLING DATE	: 04/09/2025	SAMPLING METHOD	: Grab
RECEIVED DATE	: 05/09/2025	SAMPLING TIME	: 09:05
ANALYTICAL DATE	: 12/09/2028	SITE OPERATOR	: Mr.Tanachot Changlor
REPORT DATE	: 17/09/2025		: -
SAMPLE CONDITION	: เหลืองใส	FILE CODE	: 225003_WW_September

PARAMETER	UNIT	ANALYSIS METHODS	ND (non-detectable)	STATION
				Biological Treatment Effluent
Ammonia Nitrogen	mg/l	Method 350.2	< 0.02	0.05

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

(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.	: 1886/68
SAMPLING BY	: SECOT Co., Ltd.	REGISTRATION No.	: ๓-239
SAMPLING DATE	: 03/10/2025	SAMPLING METHOD	: Grab
RECEIVED DATE	: 04/10/2025	SAMPLING TIME	: 09:54
ANALYTICAL DATE	: 04-14/10/2025	SITE OPERATOR	: Miss Wiraya Patchimboon
REPORT DATE	: 14/10/2025	FILE CODE	: ๓-239-๓-0038
SAMPLE CONDITION	: เหลืองใส		: 225003_WW_October

PARAMETER	UNIT	ANALYSIS METHODS	ND (non-detectable)	STATION
				Biological Treatment Effluent
Temperature	°C	2550 B	< 0.5	33.9
pH	-	4500-H ⁺ B	< 0.10	7.43
Total Dissolved Solids	mg/l	2540 C	< 25	1,122
Suspended Solids	mg/l	2540 D	< 2.5	4.0
Fat Oil & Grease	mg/l	5520 B	< 2.0	ND
Phenols	mg/l	5530 B,C	< 0.001	ND
Sulfide as H ₂ S	mg/l	4500-S ²⁻ F	< 0.20	ND
BOD ₅	mg/l	5210 B	< 1.0	< 1.0
COD	mg/l	5220 D	< 40.00	41.04
Chromium Trivalent (Cr ³⁺)	mg/l	3113 B/Calculation	< 0.001	ND
Chromium Hexavalent (Cr ⁶⁺)	mg/l	3500-Cr B	< 0.01	ND
Mercury (Hg)	mg/l	3112 B	< 0.0005	0.0006

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

(Miss Khemchuda Insorn)

Analyst

REG. NO. ๓-239-๓-0005

(Mrs. Araya Tipparuk)

Technical Management Team

REG. NO. ๓-239-๓-0004

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WATER AND WASTEWATER ANALYSIS REPORT

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SAMPLING DATE	: 03/10/2025	SAMPLING METHOD	: Grab
RECEIVED DATE	: 04/10/2025	SAMPLING TIME	: 09:54
ANALYTICAL DATE	: 04/10/2025	SITE OPERATOR	: Miss Wiraya Patchimboon
REPORT DATE	: 14/10/2025		: -
SAMPLE CONDITION	: เหลืองใส	FILE CODE	: 225003_WW_October

PARAMETER	UNIT	ANALYSIS METHODS	ND (non-detectable)	STATION
				Biological Treatment Effluent
Ammonia Nitrogen	mg/l	Method 350.2	< 0.02	0.04

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

(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.	: 2118/68
SAMPLING BY	: SECOT Co., Ltd.	REGISTRATION No.	: ๓-239
SAMPLING DATE	: 07/11/2025	SAMPLING METHOD	: Grab
RECEIVED DATE	: 08/11/2025	SAMPLING TIME	: 09:44
ANALYTICAL DATE	: 08-15/11/2025	SITE OPERATOR	: Mr. Baworn Deechaiya
REPORT DATE	: 15/11/2025		: ๓-239-๓-0005
SAMPLE CONDITION	: เหลืองใสมีตะกอน	FILE CODE	: 225003_WW_November

PARAMETER	UNIT	ANALYSIS METHODS	ND	STATION
			(non-detectable)	Biological Treatment Effluent
Temperature	°C	2550 B	< 0.5	31.4
pH		4500-H ⁺ B	< 0.10	7.44
Total Dissolved Solids	mg/l	2540 C	< 25	1,079
Suspended Solids	mg/l	2540 D	< 2.5	5.8
Fat Oil & Grease	mg/l	5520 B	< 2.0	ND
Phenols	mg/l	5530 B,C	< 0.001	ND
Sulfide as H ₂ S	mg/l	4500-S ²⁻ F	< 0.20	ND
BOD ₅	mg/l	5210 B	< 1.0	< 1.0
COD	mg/l	5220 D	< 10.00	21.39
Chromium Trivalent (Cr ³⁺)	mg/l	3113 B/Calculation	< 0.001	ND
Chromium Hexavalent (Cr ⁶⁺)	mg/l	3500-Cr B	< 0.01	ND
Mercury (Hg)	mg/l	3112 B	< 0.0005	0.0011

REFERENCE: STANDARD METHODS FOR EXAMINATION OF WATER AND WASTEWATER 24th ED. 2023 (AWWA, APHA, WEF)

(Miss Khemchuda Insorn)

Analyst

REG. NO. ๓-239-๓-0005

(Mrs. Araya Tipparuk)

Technical Management Team

REG. NO. ๓-239-๓-0004

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WATER AND WASTEWATER ANALYSIS REPORT

CLIENT NAME	: Star Petroleum Refining Public Co., Ltd.	REQUEST SERVICE No.	: 2118/68
SAMPLING BY	: SECOT Co., Ltd.	REGISTRATION No.	: -
SAMPLING DATE	: 07/11/2025	SAMPLING METHOD	: Grab
RECEIVED DATE	: 08/11/2025	SAMPLING TIME	: 09:44
ANALYTICAL DATE	: 10/11/2025	SITE OPERATOR	: Mr. Baworn Deechaiya
REPORT DATE	: 15/11/2025		: -
SAMPLE CONDITION	: เหลืองใสมีตะกอน	FILE CODE	: 225003_WW_November

PARAMETER	UNIT	ANALYSIS METHODS	ND (non-detectable)	STATION Biological Treatment Effluent
Ammonia Nitrogen	mg/l	Method 350.2	< 0.02	0.12

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

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WATER AND WASTEWATER ANALYSIS REPORT

CLIENT NAME	: Star Petroleum Refining Public Co., Ltd.	REQUEST SERVICE No.	: 2326/68
SAMPLING BY	: SECOT Co., Ltd.	REGISTRATION No.	: ๖-239
SAMPLING DATE	: 04/12/2025	SAMPLING METHOD	: Grab
RECEIVED DATE	: 05/12/2025	SAMPLING TIME	: 09:08
ANALYTICAL DATE	: 05-17/12/2025	SITE OPERATOR	: Mr.Thanawut Duansaeng
REPORT DATE	: 18/12/2025		: ๖-239-๓-0031
SAMPLE CONDITION	: เหลืองใสมีตะกอน	FILE CODE	: 225003_WW_December

PARAMETER	UNIT	ANALYSIS METHODS	ND (non-detectable)	STATION
				Biological Treatment Effluent
Temperature	°C	2550 B	< 0.5	31.5
pH	-	4500-H ⁺ B	< 0.10	7.39
Total Dissolved Solids	mg/l	2540 C	< 25	1,127
Suspended Solids	mg/l	2540 D	< 2.5	9.0
Fat Oil & Grease	mg/l	5520 B	< 2.0	ND
Phenols	mg/l	5530 B,C	< 0.001	ND
Sulfide as H ₂ S	mg/l	4500-S ²⁻ F	< 0.20	ND
BOD ₅	mg/l	5210 B	< 1.0	6.6
COD	mg/l	5220 D	< 10.00	38.24
Chromium Trivalent (Cr ³⁺)	mg/l	3113 B/Calculation	< 0.001	ND
Chromium Hexavalent (Cr ⁶⁺)	mg/l	3500-Cr B	< 0.01	ND
Mercury (Hg)	mg/l	3112 B	< 0.0005	0.0017

REFERENCE : STANDARD METHODS FOR EXAMINATION OF WATER AND WASTEWATER 24th ED., 2023 (AWWA, APHA, WEF)

(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.	: 2326/68
SAMPLING BY	: SECOT Co., Ltd.	REGISTRATION No.	: -
SAMPLING DATE	: 04/12/2025	SAMPLING METHOD	: Grab
RECEIVED DATE	: 05/12/2025	SAMPLING TIME	: 09:08
ANALYTICAL DATE	: 10/12/2025	SITE OPERATOR	: Mr.Thanawut Duansaeng
REPORT DATE	: 18/12/2025		: -
SAMPLE CONDITION	: เหลืองใสมีตะกอน	FILE CODE	: 225003_WW_December

PARAMETER	UNIT	ANALYSIS METHODS	ND (non-detectable)	STATION
				Biological Treatment Effluent
Ammonia Nitrogen	mg/l	Method 350.2	< 0.02	0.03

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

(Miss Khemchuda Insorn)

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· WATER AND WASTEWATER ANALYSIS REPORT

CLIENT NAME	: Star Petroleum Refining Public Co., Ltd.	REQUEST SERVICE No.	: 1421/68
SAMPLING BY	: SECOT Co., Ltd.	REGISTRATION No.	: -
SAMPLING DATE	: 05/08/2025	SAMPLING METHOD	: Integrate
RECEIVED DATE	: 06/08/2025	SAMPLING TIME	: 13:48
ANALYTICAL DATE	: 06-21/08/2025	SITE OPERATOR	: Mr. Baworn Deechaiya
REPORT DATE	: 21/08/2025		: -
SAMPLE CONDITION	: ใส	FILE CODE	: 225003_CW_August

PARAMETER	UNITS	ANALYSIS METHODS	ND (non-detectable)	SATATION	STANDARD ^{1/}
				Ko Saket	
Depth	m.	Measurement	-	2.8	-
Temperature	°C	2550 B	< 0.5	30.9	$\Delta \leq 2$
pH	-	4500-H ⁺ B	< 0.10	7.99	7.0-8.5
Transparency	m.	Secchi Disc	-	2.5	$\Delta \leq 10 \%$
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	15.8	^{2/}
Ammonia Nitrogen	µg/l	4500-NH ₃ F	< 10.0	ND	-
Phenols	mg/l	5530 B-C	< 0.001	ND	≤ 0.03
Dissolved Oxygen	mg/l	4500-O G	< 0.10	7.74	≥ 4
BOD ₅	mg/l	5210 B	< 1.0	5.2	-
Salinity	ppt	2520 B	< 0.10	33.0	$\Delta \leq 10 \%$
Total Petroleum Hydrocarbon	µg/l	IOC/GGE(MSI)-III/3	< 0.10	ND	≤ 5
TOC [*]	mg/l	5310 B	< 0.01	5.68	-
Chromium Trivalent (Cr ³⁺)	µg/l	3113 B / Calculation	< 1.00	ND	-
Chromium Hexavalent (Cr ⁶⁺)	µg/l	3113 B	< 1.00	ND	≤ 50
Mercury (Hg)	µg/l	3112 B	< 0.05	ND	≤ 0.1

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

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

Khemchuda Insorn

(Miss Khemchuda Insorn)

Analyst

Araya Tipparuk

(Mrs. Araya Tipparuk)

Technical Management Team

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Δ : Change from natural condition, \leq : Not more than, NV : Not visible, \geq : Not less than.

^{2/} 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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WATER AND WASTEWATER ANALYSIS REPORT

CLIENT NAME	: Star Petroleum Refining Public Co., Ltd.	REQUEST SERVICE No.	: 2308/68
SAMPLING BY	: SECOT Co., Ltd.	REGISTRATION No.	: -
SAMPLING DATE	: 03/12/2025	SAMPLING METHOD	: Integrate
RECEIVED DATE	: 04/12/2025	SAMPLING TIME	: 09:55
ANALYTICAL DATE	: 04-12/12/2025	SITE OPERATOR	: Mr. Baworn Deechaiya
REPORT DATE	: 19/12/2025	FILE CODE	: 225003_CW_December
SAMPLE CONDITION	: ใส		

PARAMETER	UNITS	ANALYSIS METHODS	ND (non-detectable)	SATATION	STANDARD ^{1/}
				Ko Saket	
Depth	m.	Measurement	-	3.4	-
Temperature	°C	2550 B	< 0.5	27.2	$\Delta \leq 2$
pH	-	4500-H ⁺ B	< 0.10	8.39	7.0-8.5
Transparency	m.	Secchi Disc	-	2.5	$\Delta \leq 10 \%$
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	2.2	^{2/}
Ammonia Nitrogen	µg/l	4500-NH ₃ F	< 10.0	15.4	-
Phenols	mg/l	5530 B-C	< 0.001	ND	≤ 0.03
Dissolved Oxygen	mg/l	4500-O G	< 0.10	7.88	≥ 4
BOD ₅	mg/l	5210 B	< 1.0	< 1.0	-
Salinity	ppt	2520 B	< 0.10	32.4	$\Delta \leq 10 \%$
Total Petroleum Hydrocarbon	µg/l	IOC/GGE(MSI)-III/3	< 0.10	ND	≤ 5
TOC [*]	mg/l	5310 B	< 0.01	2.48	-
Arsenic (As)	µg/l	3114 C	< 0.10	1.58	≤ 10
Chromium Trivalent (Cr ³⁺)	µg/l	3113 B / Calculation	< 1.00	ND	-
Chromium Hexavalent (Cr ⁶⁺)	µg/l	3113 B	< 1.00	ND	≤ 50
Mercury (Hg)	µg/l	3112 B	< 0.05	ND	≤ 0.1
Nickel (Ni)	µg/l	3113 B	< 5.00	ND	-
Vanadium (V)	µg/l	3120 B	< 10.00	ND	-

REFERENCE : STANDARD METHODS FOR EXAMINATION OF WATER AND WASTEWATER 24th ED., 2023 (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. :	1421/68
SAMPLING BY	: SECOT Co., Ltd.	REGISTRATION No. :	-
SAMPLING DATE	: 05/08/2025	SAMPLING METHOD	: Integrate
RECEIVED DATE	: 06/08/2025	SAMPLING TIME	: 14:06
ANALYTICAL DATE	: 06-21/08/2025 *	SITE OPERATOR	: Mr. Baworn Deechaiya
REPORT DATE	: 21/08/2025		
SAMPLE CONDITION	: ใส	FILE CODE	: 225003_CW_August

PARAMETER	UNITS	ANALYSIS METHODS	ND (non-detectable)	SATATION	STANDARD ^{1/}
				Had Sai Thong Beach	
Depth	m.	Measurement	-	3.8	-
Temperature	°C	2550 B	< 0.5	31.6	$\Delta \leq 2$
Transparency	m.	Secchi Disc	-	2.5	$\Delta \leq 10 \%$
pH	-	4500-H ⁺ B	< 0.10	8.34	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	14.8	^{2/}
Ammonia Nitrogen	µg/l	4500-NH ₃ F	< 10.0	ND	-
Phenols	mg/l	5530 B-C	< 0.001	ND	≤ 0.03
Dissolved Oxygen	mg/l	4500-O G	< 0.10	7.28	≥ 4
BOD ₅	mg/l	5210 B	< 1.0	< 1.0	-
Salinity	ppt	2520 B	< 0.10	33.0	$\Delta \leq 10 \%$
Total Petroleum Hydrocarbon	µg/l	IOC/GGE(MSI)-III/3	< 0.10	ND	≤ 5
TOC *	mg/l	5310 B	< 0.01	16.01	-
Chromium Trivalent (Cr ³⁺)	µg/l	3113 B / Calculation	< 1.00	ND	-
Chromium Hexavalent (Cr ⁶⁺)	µg/l	3113 B	< 1.00	ND	≤ 50
Mercury (Hg)	µg/l	3112 B	< 0.05	ND	≤ 0.1

REFERENCE : STANDARD METHODS FOR EXAMINATION OF WATER AND WASTEWATER 21st ED., 2017 (AWWA, APHA, WEF)

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

(Miss Khemchuda Insorn)

Analyst

(Mrs. Araya Tippiaruk)

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



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WATER AND WASTEWATER ANALYSIS REPORT

CLIENT NAME	: Star Petroleum Refining Public Co., Ltd.	REQUEST SERVICE No.	: 2308/68
SAMPLING BY	: SECOT Co., Ltd.	REGISTRATION No.	: -
SAMPLING DATE	: 03/12/2025	SAMPLING METHOD	: Integrate
RECEIVED DATE	: 04/12/2025	SAMPLING TIME	: 09:48
ANALYTICAL DATE	: 04-12/2025	SITE OPERATOR	: Mr. Baworn Deechaiya
REPORT DATE	: 19/12/2025	FILE CODE	: 225003_CW_December
SAMPLE CONDITION	: ใส		

PARAMETER	UNITS	ANALYSIS METHODS	ND (non-detectable)	SATATION	STANDARD ^{1/}
				Had Sai Thong Beach	
Depth	m.	Measurement	-	3.5	-
Temperature	°C	2550 B	< 0.5	27.9	$\Delta \leq 2$
Transparency	m.	Secchi Disc	-	2.0	$\Delta \leq 10 \%$
pH	-	4500-H ⁺ B	< 0.10	8.23	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	5.2	^{2/}
Ammonia Nitrogen	µg/l	4500-NH ₃ F	< 10.0	12.4	-
Phenols	mg/l	5530 B-C	< 0.001	ND	≤ 0.03
Dissolved Oxygen	mg/l	4500-O G	< 0.10	7.05	≥ 4
BOD ₅	mg/l	5210 B	< 1.0	< 1.0	-
Salinity	ppt	2520 B	< 0.10	33.4	$\Delta \leq 10 \%$
Total Petroleum Hydrocarbon	µg/l	IOC/GGE(MSD)-III/3	< 0.10	ND	≤ 5
TOC [*]	mg/l	5310 B	< 0.01	2.44	-
Arsenic (As)	µg/l	3114 C	< 0.10	1.50	≤ 10
Chromium Trivalent (Cr ³⁺)	µg/l	3113 B / Calculation	< 1.00	ND	-
Chromium Hexavalent (Cr ⁶⁺)	µg/l	3113 B	< 1.00	ND	≤ 50
Mercury (Hg)	µg/l	3112 B	< 0.05	ND	≤ 0.1
Nickel (Ni)	µg/l	3113 B	< 5.00	ND	-
Vanadium (V)	µg/l	3120 B	< 10.00	ND	-

REFERENCE : STANDARD METHODS FOR EXAMINATION OF WATER AND WASTEWATER 24th ED, 2023 (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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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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WATER AND WASTEWATER ANALYSIS REPORT

CLIENT NAME	: Star Petroleum Refining Public Co., Ltd.	REQUEST SERVICE No.	: 1421/68
SAMPLING BY	: SECOT Co., Ltd.	REGISTRATION No.	: -
SAMPLING DATE	: 05/08/2025	SAMPLING METHOD	: Integrate
RECEIVED DATE	: 06/08/2025	SAMPLING TIME	: 13:59
ANALYTICAL DATE	: 06-21/08/2025	SITE OPERATOR	: Mr. Baworn Deechaiya
REPORT DATE	: 21/08/2025	FILE CODE	: 225003_CW_August
SAMPLE CONDITION	: ใส		

PARAMETER	UNITS	ANALYSIS METHODS	ND (non-detectable)	SATATION	STANDARD ^{1/}
				Wastewater Discharge Point of Refinery (IEAT)	
Depth	m.	Measurement	-	2.5	-
Temperature	°C	2550 B	< 0.5	31.4	$\Delta \leq 2$
Transparency	m.	Secchi Disc	-	1.5	$\Delta \leq 10 \%$
pH	-	4500-H ⁺ B	< 0.10	8.34	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	19.8	^{2/}
Ammonia Nitrogen	µg/l	4500-NH ₃ F	< 10.0	ND	-
Phenols	mg/l	5530 B-C	< 0.001	ND	≤ 0.03
Dissolved Oxygen	mg/l	4500-O G	< 0.10	6.62	≥ 4
BOD ₅	mg/l	5210 B	< 1.0	< 1.0	-
Salinity	ppt	2520 B	< 0.10	33.0	$\Delta \leq 10 \%$
Chromium Trivalent (Cr ³⁺)	µg/l	3113 B / Calculation	< 1.00	ND	-
Chromium Hexavalent (Cr ⁶⁺)	µg/l	3113 B	< 1.00	ND	≤ 50
Mercury (Hg)	µg/l	3112 B	< 0.05	ND	≤ 0.1

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



(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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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.	: 2308/68
SAMPLING BY	: SECOT Co., Ltd.	REGISTRATION No.	: -
SAMPLING DATE	: 03/12/2025	SAMPLING METHOD	: Integrate
RECEIVED DATE	: 04/12/2025	SAMPLING TIME	: 09:37
ANALYTICAL DATE	: 04-12/12/2025	SITE OPERATOR	: Mr. Baworn Deechaiya
REPORT DATE	: 19/12/2025		: -
SAMPLE CONDITION	: ใส	FILE CODE	: 225003_CW_December

PARAMETER	UNITS	ANALYSIS METHODS	ND (non-detectable)	SATATION	STANDARD ^{1/}
				Wastewater Discharge Point of Refinery (IEAT)	
Depth	m.	Measurement	-	2.1	-
Temperature	°C	2550 B	< 0.5	28.1	$\Delta \leq 2$
Transparency	m.	Secchi Disc	-	1.5	$\Delta \leq 10 \%$
pH	-	4500-H ⁺ B	< 0.10	8.18	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	9.8	^{2/}
Ammonia Nitrogen	µg/l	4500-NH ₃ F	< 10.0	56.3	-
Phenols	mg/l	5530 B-C	< 0.001	ND	≤ 0.03
Dissolved Oxygen	mg/l	4500-O G	< 0.10	7.17	≥ 4
BOD ₅	mg/l	5210 B	< 1.0	< 1.0	-
Salinity	ppt	2520 B	< 0.10	23.3	$\Delta \leq 10 \%$
Chromium Trivalent (Cr ³⁺)	µg/l	3113 B / Calculation	< 1.00	ND	-
Chromium Hexavalent (Cr ⁶⁺)	µg/l	3113 B	< 1.00	ND	≤ 50
Mercury (Hg)	µg/l	3112 B	< 0.05	ND	≤ 0.1

REFERENCE : STANDARD METHODS FOR EXAMINATION OF WATER AND WASTEWATER 24th ED., 2023 (AWWA, APHA, WEF)



(Miss Khemchuda Insorn)
Analyst



(Mrs. Araya Tippiaruk)
Technical Management Team

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4. - Not available .



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WATER AND WASTEWATER ANALYSIS REPORT

CLIENT NAME	: Star Petroleum Refining Public Co., Ltd.	REQUEST SERVICE No.	: 1421/68
SAMPLING BY	: SECOT Co., Ltd.	REGISTRATION No.	: -
SAMPLING DATE	: 05/08/2025	SAMPLING METHOD	: Integrate
RECEIVED DATE	: 06/08/2025	SAMPLING TIME	: 13:29
ANALYTICAL DATE	: 06-21/08/2025	SITE OPERATOR	: Mr. Baworn Deechaiya
REPORT DATE	: 21/08/2025	FILE CODE	: 225003_CW_August
SAMPLE CONDITION	: ใส		

PARAMETER	UNITS	ANALYSIS METHODS	ND (non-detectable)	SATATION	STANDARD ^{1/}
				Open Coastal Water	
Depth	m.	Measurement	-	4.5	-
Temperature	°C	2550 B	< 0.5	31.4	$\Delta \leq 2$
Transparency	m.	Secchi Disc	< 0.10	2.5	$\Delta \leq 10 \%$
pH	-	4500-H ⁺ B	-	8.23	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	8.6	^{2/}
Ammonia Nitrogen	µg/l	4500-NH ₃ F	< 10.0	ND	-
Phenols	mg/l	5530 B-C	< 0.001	ND	≤ 0.03
Dissolved Oxygen	mg/l	4500-O G	< 0.10	6.69	≥ 4
BOD ₅	mg/l	5210 B	< 1.0	< 1.0	-
Salinity	ppt	2520 B	< 0.10	32.4	$\Delta \leq 10 \%$
Total Petroleum Hydrocarbon	µg/l	IOC/GGE(MSI)-III/3	< 0.10	ND	≤ 5
TOC [*]	mg/l	5310 B	< 0.01	1.86	-
Chromium Trivalent (Cr ³⁺)	µg/l	3113 B / Calculation	< 1.00	ND	-
Chromium Hexavalent (Cr ⁶⁺)	µg/l	3113 B	< 1.00	ND	≤ 50
Mercury (Hg)	µg/l	3112 B	< 0.05	ND	≤ 0.1

REFERENCE : STANDARD METHODS FOR EXAMINATION OF WATER AND WASTEWATER 21st 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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^{2/} 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.



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WATER AND WASTEWATER ANALYSIS REPORT

CLIENT NAME	: Star Petroleum Refining Public Co., Ltd.	REQUEST SERVICE No.	: 2308/68
SAMPLING BY	: SECOT Co., Ltd.	REGISTRATION No.	: -
SAMPLING DATE	: 03/12/2025	SAMPLING METHOD	: Integrate
RECEIVED DATE	: 04/12/2025	SAMPLING TIME	: 10:07
ANALYTICAL DATE	: 04-12/2025	SITE OPERATOR	: Mr. Baworn Deechaiya
REPORT DATE	: 19/12/2025		
SAMPLE CONDITION	: ใส	FILE CODE	: 225003_CW_December

PARAMETER	UNITS	ANALYSIS METHODS	ND (non-detectable)	SATATION	STANDARD ^{1/}
				Open Coastal Water	
Depth	m.	Measurement	-	5.9	-
Temperature	°C	2550 B	< 0.5	27.6	$\Delta \leq 2$
Transparency	m.	Secchi Disc	< 0.10	2.5	$\Delta \leq 10 \%$
pH	-	4500-H ⁺ B	-	8.32	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	2.8	^{2/}
Ammonia Nitrogen	µg/l	4500-NH ₃ F	< 10.0	19.8	-
Phenols	mg/l	5530 B-C	< 0.001	ND	≤ 0.03
Dissolved Oxygen	mg/l	4500-O G	< 0.10	6.97	≥ 4
BOD ₅	mg/l	5210 B	< 1.0	< 1.0	-
Salinity	ppt	2520 B	< 0.10	33.2	$\Delta \leq 10 \%$
Total Petroleum Hydrocarbon	µg/l	IOC/GGE(MSI)-III/3	< 0.10	0.51	≤ 5
TOC	mg/l	5310 B	< 0.01	2.01	-
Arsenic (As)	µg/l	3114 C	< 0.10	1.37	≤ 10
Chromium Trivalent (Cr ³⁺)	µg/l	3113 B / Calculation	< 1.00	ND	-
Chromium Hexavalent (Cr ⁶⁺)	µg/l	3113 B	< 1.00	ND	≤ 50
Mercury (Hg)	µg/l	3112 B	< 0.05	ND	≤ 0.1
Nickel (Ni)	µg/l	3113 B	< 5.00	ND	-
Vanadium (V)	µg/l	3120 B	< 10.00	ND	-

REFERENCE : STANDARD METHODS FOR EXAMINATION OF WATER AND WASTEWATER 24th ED. 2023 (AWWA, APHA, WEF)

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



(Miss Khemchuda Insorn)

Analyst



(Mrs. Araya Tipparuk)

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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. :	1422/68
SAMPLING BY	: SECOT Co., Ltd.	REGISTRATION No. :	-
SAMPLING DATE	: 05/08/2025	SAMPLING METHOD	: Integrate
RECEIVED DATE	: 06/08/2025	SAMPLING TIME	: 13:48-17:36
ANALYTICAL DATE	: 06-07/08/2025	SITE OPERATOR	: Mr. Baworn Deechaiya
REPORT DATE	: 21/08/2025		
SAMPLE CONDITION	: ใส	FILE CODE	: 225003_CW_August

PARAMETER	UNITS	ANALYSIS METHODS	ND (non-detectable)	SAMPLING TIME	Ko Saket	STANDARD (Avg.+SD.)
					RESULT	
Suspended Solid (SS)	mg/l	2540 D	< 2.5	13:48	13.60	27.27
				14:43	28.00	
				15:44	18.80	
				16:45	21.20	
				17:36	26.00	
				Average	21.52	
				SD.	5.75	

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



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Analyst



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WATER AND WASTEWATER ANALYSIS REPORT

CLIENT NAME	: Star Petroleum Refining Public Co., Ltd.	REQUEST SERVICE No.	: 1422/68
SAMPLING BY	: SECOT Co., Ltd.	REGISTRATION No.	: -
SAMPLING DATE	: 05/08/2025	SAMPLING METHOD	: Integrate
RECEIVED DATE	: 06/08/2025	SAMPLING TIME	: 13:29-17:24
ANALYTICAL DATE	: 06-07/08/2025	SITE OPERATOR	: Mr. Baworn Deechaiya
REPORT DATE	: 21/08/2025		: -
SAMPLE CONDITION	: ใส	FILE CODE	: 225003_CW_August

PARAMETER	UNITS	ANALYSIS METHODS	ND (non-detectable)	SAMPLING TIME	Open Coastal Water	STANDARD (Avg.+SD.)
					RESULT	
Suspended Solid (SS)	mg/l	2540 D	< 2.5	13:29	7.60	9.76
				14:25	3.00	
				15:30	3.00	
				16:22	12.00	
				17:24	3.00	
				Average	5.72	
				SD.	4.04	

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



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CLIENT NAME	: Star Petroleum Refining Public Co., Ltd.	REQUEST SERVICE No.	: 1422/68
SAMPLING BY	: SECOT Co., Ltd.	REGISTRATION No.	: -
SAMPLING DATE	: 05/08/2025	SAMPLING METHOD	: Integrate
RECEIVED DATE	: 06/08/2025	SAMPLING TIME	: 13:59-17:47
ANALYTICAL DATE	: 06-07/08/2025	SITE OPERATOR	: Mr. Baworn Deechaiya
REPORT DATE	: 21/08/2025		: -
SAMPLE CONDITION	: ใส	FILE CODE	: 225003_CW_August

PARAMETER	UNITS	ANALYSIS METHODS	ND (non-detectable)	SAMPLING TIME	Wastewater Discharge Point of Refinery (IEAT)	STANDARD (Avg.+SD.)
					RESULT	
Suspended Solid (SS)	mg/l	2540 D	< 2.5	13:59	14.40	28.25
				14:58	25.00	
				15:57	12.40	
				16:58	27.00	
				17:47	26.80	
				Average	21.12	
				SD.	7.13	

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



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WATER AND WASTEWATER ANALYSIS REPORT

CLIENT NAME	: Star Petroleum Refining Public Co., Ltd.	REQUEST SERVICE No. :	1422/68
SAMPLING BY	: SECOT Co., Ltd.	REGISTRATION No. :	-
SAMPLING DATE	: 05/08/2025	SAMPLING METHOD	: Integrate
RECEIVED DATE	: 06/08/2025	SAMPLING TIME	: 14:06-17:56
ANALYTICAL DATE	: 06-07/08/2025	SITE OPERATOR	: Mr. Baworn Deechaiya
REPORT DATE	: 21/08/2025		
SAMPLE CONDITION	: ใส	FILE CODE	: 225003_CW_August

PARAMETER	UNITS	ANALYSIS	ND	SAMPLING TIME	In front of	STANDARD
		METHODS	(non-detectable)		Had Sai Thong Beach	(Avg.+SD.)
RESULT						
Suspended Solid (SS)	mg/l	2540 D	< 2.5	14:06	9.60	19.96
				15:16	15.60	
				16:12	20.80	
				17:11	16.80	
				17:56	16.80	
				Average	15.92	
				SD.	4.04	

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

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ใบรับรองผลการตรวจวัดระดับเสียง



Noise Monitoring Result : Community Noise

MTR-SPRC PLC-Refinery

Location : Main Office Complex

Monitor Period : 24 Nov 2025-01 Dec 2025

SLM Model : SCARLET ST-21D

Serial No : 820723

Site Operator : Mr. Phuwadech Kaewjirakulsri

Calibrator Model : Cirrus CR:515

Serial No : 94296

Calibration Ref dB(A) : 94.0

Certified Date : 27 Feb 2025

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

Expire Date : 26 Feb 2026

Cal Sheet No.: CR-515-2025-315

Time	Equivalent Sound Pressure Level (dB(A))						
	24-25 Nov 2025	25-26 Nov 2025	26-27 Nov 2025	27-28 Nov 2025	28-29 Nov 2025	29-30 Nov 2025	30-01 Dec 2025
16:00 - 17:00	61.4	57.1	56.7	57.2	57.4	56.4	57.2
17:00 - 18:00	61.8	57.9	57.3	57.0	57.4	56.7	57.0
18:00 - 19:00	67.8	58.1	57.5	57.0	58.4	56.5	57.0
19:00 - 20:00	65.7	58.9	57.8	56.9	58.6	56.6	56.9
20:00 - 21:00	62.3	59.8	58.8	57.0	59.8	56.7	57.0
21:00 - 22:00	62.8	58.4	59.0	56.8	59.1	56.5	56.8
22:00 - 23:00	62.0	57.5	58.5	57.8	59.6	57.0	57.8
23:00 - 00:00	58.0	57.4	58.7	56.7	57.9	57.1	56.7
00:00 - 01:00	63.0	57.1	57.3	57.6	57.3	57.1	57.6
01:00 - 02:00	58.3	56.3	57.0	57.5	56.8	56.5	57.5
02:00 - 03:00	58.0	56.6	57.2	57.3	56.9	56.8	57.3
03:00 - 04:00	58.9	56.6	57.4	57.1	58.0	57.1	57.1
04:00 - 05:00	57.6	56.5	57.5	57.1	57.0	57.1	57.1
05:00 - 06:00	57.8	56.7	57.7	56.4	57.1	58.5	56.4
06:00 - 07:00	56.6	56.8	58.2	56.8	56.9	58.1	56.8
07:00 - 08:00	56.3	56.7	58.2	57.0	56.6	58.5	57.0
08:00 - 09:00	57.1	57.5	58.4	56.6	57.0	57.0	56.6
09:00 - 10:00	56.5	56.9	57.9	57.0	57.6	57.0	57.0
10:00 - 11:00	57.3	56.2	57.1	56.6	58.0	56.9	56.6
11:00 - 12:00	56.8	56.8	57.2	56.8	57.3	57.0	56.8
12:00 - 13:00	56.8	56.4	56.6	57.7	57.2	56.8	57.7
13:00 - 14:00	57.0	56.3	56.5	56.8	56.8	57.8	56.8
14:00 - 15:00	57.8	57.5	57.3	57.0	57.1	56.7	57.0
15:00 - 16:00	57.4	57.3	57.0	57.2	56.6	57.6	57.2
Leq(24)*	60.8	57.3	57.7	57.1	57.7	57.1	57.1
Ldn	66.2	63.4	64.2	63.5	64.0	63.7	63.5
Lmax **	73.4	60.4	59.7	58.6	60.8	59.3	58.6
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 : Main Office Complex

Monitor Period : 24 Nov 2025-01 Dec 2025

SLM Model : SCARLET ST-21D

Serial No : 820723

Site Operator : Mr. Phuwadech Kaewjirakulsri

Calibrator Model : Cirrus CR:515

Serial No : 94296

Calibration Ref dB(A) : 94.0

Certified Date : 27 Feb 2025

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

Expire Date : 26 Feb 2026

Cal Sheet No.: CR-515-2025-315

Time	L90 (dB(A))						
	24-25 Nov 2025	25-26 Nov 2025	26-27 Nov 2025	27-28 Nov 2025	28-29 Nov 2025	29-30 Nov 2025	30-01 Dec 2025
16:00 - 17:00	57.6	56.5	56.1	56.3	56.4	56.0	56.3
17:00 - 18:00	58.5	56.9	56.1	56.4	57.0	55.8	56.4
18:00 - 19:00	57.7	57.5	56.9	56.0	57.6	55.8	56.0
19:00 - 20:00	58.2	58.3	57.3	56.2	58.0	55.8	56.2
20:00 - 21:00	58.9	57.9	58.1	56.5	58.9	55.6	56.5
21:00 - 22:00	57.5	57.0	58.0	56.0	57.9	55.9	56.0
22:00 - 23:00	58.0	56.8	58.0	56.7	58.5	56.2	56.7
23:00 - 00:00	57.3	56.2	57.5	56.3	56.8	56.2	56.3
00:00 - 01:00	57.2	56.5	56.8	56.8	56.7	56.2	56.8
01:00 - 02:00	57.4	56.0	56.2	56.5	56.1	55.8	56.5
02:00 - 03:00	57.3	55.5	56.4	56.6	56.2	55.8	56.6
03:00 - 04:00	57.7	55.9	56.8	56.2	56.8	56.2	56.2
04:00 - 05:00	56.8	56.1	57.0	56.4	56.3	56.5	56.4
05:00 - 06:00	56.2	56.1	57.1	55.5	56.3	57.0	55.5
06:00 - 07:00	56.1	56.3	57.3	55.9	56.3	57.6	55.9
07:00 - 08:00	55.7	56.3	57.7	56.5	56.2	57.7	56.5
08:00 - 09:00	55.7	55.9	57.7	56.0	56.4	56.4	56.0
09:00 - 10:00	56.0	56.3	57.0	55.6	56.7	56.0	55.6
10:00 - 11:00	56.5	55.7	56.7	56.0	57.2	56.2	56.0
11:00 - 12:00	56.2	56.0	56.5	56.3	56.6	56.5	56.3
12:00 - 13:00	56.3	55.7	56.1	56.6	56.5	56.0	56.6
13:00 - 14:00	56.4	55.5	55.9	56.2	56.5	56.7	56.2
14:00 - 15:00	57.1	56.5	56.7	56.1	56.4	56.3	56.1
15:00 - 16:00	56.5	55.9	56.1	56.3	55.8	56.8	56.3
L90(avg)*	57.1	56.4	57.0	56.3	56.9	56.3	56.3

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

(Miss Katesarin Vorradetwittaya)
Environmental Scientist

Preeda S.
(Miss Preeda Somjai)
Technical Management Team



Noise Monitoring Result : Community Noise

MTR-SPRC PLC-Refinery

Location : Central Control Building

Monitor Period : 24 Nov 2025-01 Dec 2025

SLM Model : Cirrus CR162C

Serial No : G300841

Site Operator : Mr. Phuwadech Kaewjirakulsri

Calibrator Model : Cirrus CR:515

Serial No : 94296

Calibration Ref dB(A) : 94.0

Certified Date : 27 Feb 2025

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

Expire Date : 26 Feb 2026

Cal Sheet No.: CR-515-2025-316

Time	Equivalent Sound Pressure Level (dB(A))						
	24-25 Nov 2025	25-26 Nov 2025	26-27 Nov 2025	27-28 Nov 2025	28-29 Nov 2025	29-30 Nov 2025	30-01 Dec 2025
16:00 - 17:00	64.4	64.7	65.3	64.9	66.3	65.5	64.8
17:00 - 18:00	64.7	65.0	65.6	65.2	66.0	65.8	64.9
18:00 - 19:00	64.5	64.5	65.0	64.8	65.4	65.7	65.0
19:00 - 20:00	64.4	64.4	65.1	64.6	65.6	66.0	65.1
20:00 - 21:00	64.8	64.8	64.8	64.7	65.7	66.0	65.6
21:00 - 22:00	64.8	65.1	64.9	64.8	65.7	66.0	65.8
22:00 - 23:00	65.1	65.0	65.1	65.1	65.7	66.3	65.9
23:00 - 00:00	65.2	65.0	65.2	65.2	65.9	66.7	65.7
00:00 - 01:00	65.2	64.7	65.1	65.1	66.0	66.1	66.2
01:00 - 02:00	65.2	64.6	65.3	65.3	66.0	65.8	66.0
02:00 - 03:00	65.2	64.7	66.2	65.3	66.0	65.8	66.0
03:00 - 04:00	65.2	64.7	66.4	65.3	66.0	65.9	66.0
04:00 - 05:00	64.7	64.7	66.3	65.2	66.1	66.5	66.2
05:00 - 06:00	65.0	64.9	66.0	65.5	66.2	66.9	66.4
06:00 - 07:00	64.5	65.1	65.0	65.8	66.2	66.4	66.1
07:00 - 08:00	64.4	65.5	65.1	66.4	66.1	66.1	65.9
08:00 - 09:00	64.1	65.7	65.6	66.6	66.1	66.1	65.5
09:00 - 10:00	64.1	65.1	65.8	66.6	65.5	65.5	65.0
10:00 - 11:00	66.0	65.3	65.8	66.5	65.5	65.5	65.4
11:00 - 12:00	65.8	64.8	65.5	66.2	65.0	65.0	65.8
12:00 - 13:00	65.3	64.3	65.1	65.6	64.5	64.7	64.3
13:00 - 14:00	65.6	66.8	65.8	66.3	64.9	64.1	66.8
14:00 - 15:00	65.5	64.8	65.8	66.2	65.3	64.2	65.8
15:00 - 16:00	65.0	65.2	64.8	66.4	65.1	64.6	64.8
Leq(24)*	65.0	65.0	65.5	65.6	65.7	65.8	65.7
Ldn	71.4	71.3	72.0	71.8	72.4	72.6	72.4
Lmax **	100.1	105.5	105.1	102.7	105.5	96.1	99.3
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 : Central Control Building

Monitor Period : 24 Nov 2025-01 Dec 2025

SLM Model : Cirrus CR162C

Serial No : G300841

Site Operator : Mr. Phuwadech Kaewjirakulsri

Calibrator Model : Cirrus CR:515

Serial No : 94296

Calibration Ref dB(A) : 94.0

Certified Date : 27 Feb 2025

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


Expire Date : 26 Feb 2026

Cal Sheet No.: CR-515-2025-316

Time	L90 (dB(A))						
	24-25 Nov 2025	25-26 Nov 2025	26-27 Nov 2025	27-28 Nov 2025	28-29 Nov 2025	29-30 Nov 2025	30-01 Dec 2025
16:00 - 17:00	61.8	63.2	63.4	63.2	64.3	64.2	63.2
17:00 - 18:00	62.3	63.0	63.8	63.6	64.5	64.3	62.9
18:00 - 19:00	63.3	63.3	63.6	63.2	64.0	64.3	63.5
19:00 - 20:00	63.1	63.1	63.8	63.0	63.9	64.5	63.7
20:00 - 21:00	63.4	63.4	62.7	63.1	64.5	64.8	63.9
21:00 - 22:00	63.3	63.7	62.9	63.3	64.5	64.6	63.9
22:00 - 23:00	63.8	63.6	63.5	63.8	64.6	64.7	64.3
23:00 - 00:00	64.1	63.8	64.1	64.1	64.6	65.1	64.2
00:00 - 01:00	64.1	63.1	63.7	63.7	65.0	64.8	63.9
01:00 - 02:00	63.9	63.1	63.8	63.8	64.6	64.4	63.7
02:00 - 03:00	63.9	63.5	64.5	64.2	64.8	64.8	64.3
03:00 - 04:00	64.1	63.3	64.0	64.2	65.0	64.7	64.5
04:00 - 05:00	63.2	63.2	64.3	63.9	64.5	65.1	63.9
05:00 - 06:00	63.0	63.4	64.5	63.8	64.7	65.0	64.3
06:00 - 07:00	63.3	63.5	63.5	64.1	65.1	65.0	64.7
07:00 - 08:00	63.1	63.9	63.7	64.4	64.8	64.8	64.4
08:00 - 09:00	62.0	63.9	63.9	64.5	64.5	64.5	63.7
09:00 - 10:00	61.6	63.2	63.9	63.1	63.3	63.3	63.3
10:00 - 11:00	63.4	63.4	63.1	63.9	63.3	63.3	63.4
11:00 - 12:00	63.6	62.7	62.2	64.3	63.4	63.4	63.6
12:00 - 13:00	63.3	61.7	63.1	63.6	63.1	62.7	61.7
13:00 - 14:00	62.7	63.0	63.4	63.8	63.0	61.8	63.0
14:00 - 15:00	63.0	62.3	62.7	64.5	63.6	62.2	62.7
15:00 - 16:00	63.2	62.6	62.9	64.0	63.7	63.1	62.9
L90(avg)*	63.2	63.2	63.6	63.8	64.3	64.2	63.7

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 : Northern Refinery Boundary Station 1

Monitor Period : 24 Nov 2025-01 Dec 2025

SLM Model : SCARLET ST-21D

Serial No : 820726

Site Operator : Mr. Phuwadech Kaewjirakulsri

Calibrator Model : Cirrus CR:515

Serial No : 94296

Calibration Ref dB(A) : 94.0

Certified Date : 27 Feb 2025

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

Expire Date : 26 Feb 2026

Cal Sheet No.: CR-515-2025-315

Time	Equivalent Sound Pressure Level (dB(A))						
	24-25 Nov 2025	25-26 Nov 2025	26-27 Nov 2025	27-28 Nov 2025	28-29 Nov 2025	29-30 Nov 2025	30-01 Dec 2025
16:00 - 17:00	40.8	45.7	43.2	55.9	62.2	61.7	54.7
17:00 - 18:00	47.5	44.7	47.3	55.8	58.7	61.1	54.1
18:00 - 19:00	46.3	44.1	47.2	54.5	62.3	61.4	56.0
19:00 - 20:00	46.9	43.2	45.7	57.7	57.8	60.8	55.1
20:00 - 21:00	44.6	43.0	46.4	56.8	60.3	62.6	55.3
21:00 - 22:00	41.4	43.2	48.2	54.8	60.2	62.9	55.0
22:00 - 23:00	43.9	48.4	44.7	56.8	66.1	59.5	55.9
23:00 - 00:00	45.5	45.2	56.6	58.3	64.6	60.9	56.3
00:00 - 01:00	42.0	40.2	44.7	55.5	63.6	62.5	54.7
01:00 - 02:00	41.8	43.2	44.6	58.0	60.6	63.2	58.9
02:00 - 03:00	44.6	43.8	51.1	58.3	63.8	58.0	57.6
03:00 - 04:00	48.5	51.1	50.9	58.8	62.6	58.3	57.8
04:00 - 05:00	47.8	42.3	46.7	56.3	64.0	58.8	56.6
05:00 - 06:00	49.1	43.0	42.9	59.3	68.3	56.3	56.3
06:00 - 07:00	45.1	56.8	44.3	56.7	63.7	59.3	57.1
07:00 - 08:00	42.2	45.4	42.0	57.8	64.3	56.7	56.5
08:00 - 09:00	42.0	44.1	56.9	58.1	62.5	57.8	57.3
09:00 - 10:00	56.7	50.9	44.9	59.1	64.2	58.1	56.8
10:00 - 11:00	43.2	41.3	45.8	60.1	61.8	59.1	56.8
11:00 - 12:00	47.2	56.2	56.7	59.4	61.5	60.1	57.0
12:00 - 13:00	42.0	44.2	63.1	59.6	62.8	59.4	57.8
13:00 - 14:00	44.1	48.5	56.2	59.4	62.6	59.6	57.4
14:00 - 15:00	46.7	44.8	44.5	58.8	61.4	59.4	57.1
15:00 - 16:00	56.2	47.0	43.4	61.5	61.4	62.5	57.9
Leq(24)*	48.4	48.6	52.9	58.1	63.1	60.4	56.7
Ldn	53.1	55.7	57.2	64.2	70.8	66.6	63.3
Lmax **	65.3	58.6	67.6	66.9	68.8	65.4	60.2
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

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 : 24 Nov 2025-01 Dec 2025

SLM Model : SCARLET ST-21D

Serial No : 820726

Site Operator : Mr. Phuwadech Kaewjirakulsri

Calibrator Model : Cirrus CR:515

Serial No : 94296

Calibration Ref dB(A) : 94.0

Certified Date : 27 Feb 2025

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

Expire Date : 26 Feb 2026

Cal Sheet No.: CR-515-2025-315

Time	L90 (dB(A))						
	24-25 Nov 2025	25-26 Nov 2025	26-27 Nov 2025	27-28 Nov 2025	28-29 Nov 2025	29-30 Nov 2025	30-01 Dec 2025
16:00 - 17:00	36.3	41.4	39.6	51.5	58.5	58.2	48.1
17:00 - 18:00	44.8	40.6	42.7	51.7	57.8	57.2	59.6
18:00 - 19:00	43.4	39.2	41.8	52.1	57.6	57.8	53.3
19:00 - 20:00	41.9	38.2	41.8	53.3	56.7	57.2	51.7
20:00 - 21:00	41.8	38.9	43.9	53.1	56.2	58.3	51.4
21:00 - 22:00	40.4	38.2	43.7	52.7	56.8	58.7	51.2
22:00 - 23:00	39.9	42.6	40.6	52.9	61.0	57.7	52.8
23:00 - 00:00	43.6	41.2	52.7	53.8	63.7	56.7	52.7
00:00 - 01:00	38.4	38.3	40.8	54.3	61.2	59.5	51.6
01:00 - 02:00	37.1	38.5	41.1	54.9	58.9	59.7	54.8
02:00 - 03:00	41.7	39.4	49.5	54.8	59.5	54.9	54.4
03:00 - 04:00	44.9	49.5	49.9	55.9	59.1	54.8	54.1
04:00 - 05:00	46.7	37.7	44.2	53.7	60.6	55.9	52.8
05:00 - 06:00	44.7	38.5	40.0	55.4	63.6	53.7	52.5
06:00 - 07:00	42.1	52.8	39.8	53.7	62.8	55.4	52.8
07:00 - 08:00	37.1	41.0	38.6	53.4	60.1	53.7	52.8
08:00 - 09:00	38.4	40.5	52.9	54.5	59.2	53.4	53.1
09:00 - 10:00	55.7	49.9	39.6	54.9	59.8	54.5	52.9
10:00 - 11:00	38.3	36.8	44.3	58.2	58.7	54.9	52.8
11:00 - 12:00	42.0	52.8	55.7	57.9	58.5	58.2	53.3
12:00 - 13:00	41.0	39.9	58.4	56.9	58.6	57.9	53.8
13:00 - 14:00	39.2	43.3	54.6	57.5	58.9	56.9	53.8
14:00 - 15:00	41.9	42.2	47.1	58.6	58.1	57.5	53.3
15:00 - 16:00	54.6	42.8	41.2	58.1	58.1	59.5	53.7
L90(avg)*	46.2	45.1	49.7	55.3	59.8	57.2	53.6

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

(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 : 24 Nov 2025-01 Dec 2025

SLM Model : SCARLET ST-21D

Serial No : 820725

Site Operator : Mr. Phuwadech Kaewjirakulsri

Calibrator Model : Cirrus CR:515

Serial No : 94296

Calibration Ref dB(A) : 94.0

Certified Date : 27 Feb 2025

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

Expire Date : 26 Feb 2026

Cal Sheet No.: CR-515-2025-315

Time	Equivalent Sound Pressure Level (dB(A))						
	24-25 Nov 2025	25-26 Nov 2025	26-27 Nov 2025	27-28 Nov 2025	28-29 Nov 2025	29-30 Nov 2025	30-01 Dec 2025
16:00 - 17:00	54.3	55.6	58.6	55.9	55.6	49.7	49.2
17:00 - 18:00	51.2	50.4	51.1	55.6	56.5	47.9	51.4
18:00 - 19:00	49.9	49.8	48.1	48.1	53.9	51.0	54.3
19:00 - 20:00	47.6	47.6	49.6	49.6	49.3	47.6	52.5
20:00 - 21:00	48.6	47.4	47.5	47.7	47.9	48.8	48.6
21:00 - 22:00	47.1	46.5	48.2	47.6	53.2	54.8	48.3
22:00 - 23:00	47.9	47.1	46.6	45.9	48.0	52.9	47.9
23:00 - 00:00	46.6	52.3	47.6	44.6	47.6	50.0	51.5
00:00 - 01:00	46.7	47.2	48.9	44.3	46.7	49.9	47.1
01:00 - 02:00	46.4	47.0	48.2	44.1	46.5	50.1	52.3
02:00 - 03:00	46.5	47.1	47.4	44.1	46.7	49.9	47.2
03:00 - 04:00	47.0	47.0	47.2	44.4	47.6	48.8	47.0
04:00 - 05:00	47.0	47.0	46.8	43.9	46.9	49.6	47.1
05:00 - 06:00	48.8	47.6	47.0	44.8	46.9	49.7	47.0
06:00 - 07:00	56.3	52.0	49.4	48.1	47.3	50.7	47.0
07:00 - 08:00	57.9	52.0	57.2	53.6	53.9	53.7	47.6
08:00 - 09:00	53.7	54.2	52.4	50.3	52.5	52.0	52.0
09:00 - 10:00	54.2	53.5	51.8	50.8	48.7	50.4	52.0
10:00 - 11:00	52.1	49.5	52.2	52.0	50.3	49.1	54.2
11:00 - 12:00	50.5	50.7	52.2	54.3	50.0	46.8	57.9
12:00 - 13:00	49.7	50.3	52.5	51.8	49.5	47.0	53.7
13:00 - 14:00	52.0	50.1	51.4	50.1	48.5	47.8	54.2
14:00 - 15:00	51.4	51.4	55.8	50.9	48.1	49.0	52.1
15:00 - 16:00	53.7	55.5	53.7	53.4	51.0	48.9	50.1
Leq(24)*	51.7	50.9	52.0	50.7	50.9	50.3	51.6
Ldn	56.7	55.8	55.6	53.5	54.7	56.7	56.0
Lmax **	85.2	85.3	91.6	84.8	84.8	85.1	85.2
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

Preeda S.
(Miss Preeda Somjai)
Technical Management Team



Noise Monitoring Result : Background Noise

MTR-SPRC PLC-Refinery

Location : Northern Refinery Boundary Station 2

Monitor Period : 24 Nov 2025-01 Dec 2025

SLM Model : SCARLET ST-21D

Serial No : 820725

Site Operator : Mr. Phuwadech Kaewjirakulsri

Calibrator Model : Cirrus CR:515

Serial No : 94296

Calibration Ref dB(A) : 94.0

Certified Date : 27 Feb 2025

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

Expire Date : 26 Feb 2026

Cal Sheet No.: CR-515-2025-315

Time	L90 (dB(A))						
	24-25 Nov 2025	25-26 Nov 2025	26-27 Nov 2025	27-28 Nov 2025	28-29 Nov 2025	29-30 Nov 2025	30-01 Dec 2025
16:00 - 17:00	45.9	44.7	43.6	42.2	44.6	42.6	41.3
17:00 - 18:00	44.8	43.5	43.9	43.2	43.4	43.6	43.7
18:00 - 19:00	44.4	42.1	43.4	42.4	41.8	43.7	43.4
19:00 - 20:00	43.6	41.8	43.7	42.5	41.8	44.2	44.8
20:00 - 21:00	43.7	41.9	44.0	41.4	43.7	44.1	44.8
21:00 - 22:00	44.6	43.6	43.9	42.0	44.3	45.2	44.4
22:00 - 23:00	44.5	44.3	43.2	41.6	44.8	45.8	44.9
23:00 - 00:00	44.3	44.7	43.3	41.4	44.5	46.9	47.1
00:00 - 01:00	43.7	44.7	45.6	41.4	44.0	47.9	44.3
01:00 - 02:00	43.6	44.5	44.7	41.3	44.4	48.1	44.7
02:00 - 03:00	43.7	44.4	45.2	41.2	44.3	46.6	44.7
03:00 - 04:00	44.5	44.5	44.4	41.1	44.4	46.8	44.5
04:00 - 05:00	44.0	44.2	44.1	40.7	44.2	47.3	44.4
05:00 - 06:00	44.0	44.4	44.0	41.3	44.2	47.4	44.5
06:00 - 07:00	45.8	44.9	44.1	41.9	44.1	47.1	44.2
07:00 - 08:00	46.6	45.7	45.6	44.6	44.3	47.2	44.4
08:00 - 09:00	47.3	43.4	45.9	45.1	45.4	47.2	44.9
09:00 - 10:00	46.6	43.2	45.8	45.3	42.9	44.5	45.7
10:00 - 11:00	46.8	43.2	45.6	44.8	43.2	40.6	43.4
11:00 - 12:00	45.3	43.2	44.1	44.6	42.8	39.8	46.6
12:00 - 13:00	44.3	41.7	44.0	44.5	41.5	40.1	47.3
13:00 - 14:00	45.7	41.9	44.0	42.9	40.5	40.3	46.6
14:00 - 15:00	44.9	43.1	44.8	43.3	40.7	40.5	46.8
15:00 - 16:00	44.0	44.1	43.3	45.7	42.6	40.9	41.9
L90(avg)*	45.0	43.8	44.4	43.1	43.6	45.3	45.0

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

(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 : 24 Nov 2025-01 Dec 2025

SLM Model : SCARLET ST-21D

Serial No : 820724

Site Operator : Mr. Phuwadech Kaewjirakulsri

Calibrator Model : Cirrus CR:515

Serial No : 94296

Calibration Ref dB(A) : 94.0

Certified Date : 27 Feb 2025

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

Expire Date : 26 Feb 2026

Cal Sheet No.: CR-515-2025-315

Time	Equivalent Sound Pressure Level (dB(A))						
	24-25 Nov 2025	25-26 Nov 2025	26-27 Nov 2025	27-28 Nov 2025	28-29 Nov 2025	29-30 Nov 2025	30-01 Dec 2025
16:00 - 17:00	54.4	60.3	62.6	65.5	66.0	56.6	61.1
17:00 - 18:00	56.1	53.7	55.9	55.6	65.6	65.6	67.2
18:00 - 19:00	55.0	55.3	54.5	56.7	52.8	57.1	56.1
19:00 - 20:00	52.1	60.7	55.1	56.6	57.1	67.7	55.1
20:00 - 21:00	52.6	60.3	56.7	57.8	65.7	70.3	61.5
21:00 - 22:00	57.2	60.1	64.1	59.3	61.7	70.1	62.5
22:00 - 23:00	57.4	61.1	60.5	62.7	61.8	68.5	60.1
23:00 - 00:00	60.6	62.3	61.5	64.0	65.8	69.9	61.1
00:00 - 01:00	65.8	62.6	62.0	59.4	65.0	69.0	62.3
01:00 - 02:00	66.9	63.9	65.5	57.6	62.3	69.3	62.6
02:00 - 03:00	72.0	56.0	62.1	51.8	59.1	71.5	63.9
03:00 - 04:00	67.2	53.1	52.4	51.3	53.9	72.1	56.0
04:00 - 05:00	54.3	53.3	51.9	51.4	53.4	52.4	53.1
05:00 - 06:00	52.4	54.3	52.6	57.2	53.4	51.9	53.3
06:00 - 07:00	54.4	60.0	61.0	58.8	54.1	52.6	54.3
07:00 - 08:00	61.4	54.9	62.0	61.1	54.7	61.0	60.0
08:00 - 09:00	61.8	52.6	61.7	60.6	54.1	62.0	61.4
09:00 - 10:00	61.2	54.1	62.1	59.2	53.8	61.7	61.8
10:00 - 11:00	60.9	53.5	61.3	60.2	51.9	62.1	61.2
11:00 - 12:00	61.3	53.8	60.6	60.6	51.8	61.3	66.1
12:00 - 13:00	61.2	52.9	61.1	60.5	52.3	60.5	60.2
13:00 - 14:00	61.8	53.9	61.3	61.2	51.2	52.8	53.8
14:00 - 15:00	58.0	53.1	58.6	61.3	52.6	52.5	52.9
15:00 - 16:00	58.5	58.8	58.1	62.5	56.9	58.7	53.9
Leq(24)*	62.7	58.5	60.7	60.2	60.6	66.4	61.1
Ldn	71.4	66.2	67.3	65.9	67.5	74.5	66.8
Lmax **	85.5	85.8	90.8	96.8	90.6	91.7	89.6
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

Preeeda S.
(Miss Preeeda Somjai)
Technical Management Team



Noise Monitoring Result : Background Noise

MTR-SPRC PLC-Refinery

Location : Northern Refinery Boundary Station 3

Monitor Period : 24 Nov 2025-01 Dec 2025

SLM Model : SCARLET ST-21D

Serial No : 820724

Site Operator : Mr. Phuwadech Kaewjirakulsri

Calibrator Model : Cirrus CR:515

Serial No : 94296

Calibration Ref dB(A) : 94.0

Certified Date : 27 Feb 2025

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

Expire Date : 26 Feb 2026

Cal Sheet No.: CR-515-2025-315

Time	L90 (dB(A))						
	24-25 Nov 2025	25-26 Nov 2025	26-27 Nov 2025	27-28 Nov 2025	28-29 Nov 2025	29-30 Nov 2025	30-01 Dec 2025
16:00 - 17:00	49.7	52.4	56.7	56.3	60.0	51.7	55.8
17:00 - 18:00	50.5	50.3	50.5	50.5	55.2	59.8	57.0
18:00 - 19:00	50.8	50.0	51.8	50.9	50.1	52.6	54.1
19:00 - 20:00	49.8	50.2	51.8	49.9	51.8	53.1	52.8
20:00 - 21:00	49.7	51.5	51.8	50.7	52.7	54.5	53.0
21:00 - 22:00	50.0	51.7	51.6	50.6	52.4	53.8	53.6
22:00 - 23:00	50.2	51.9	51.6	50.5	52.7	53.3	51.7
23:00 - 00:00	49.3	51.8	54.1	50.6	52.8	53.6	51.9
00:00 - 01:00	51.1	51.8	52.7	50.3	52.3	55.8	51.8
01:00 - 02:00	50.2	51.7	52.1	50.6	52.7	53.1	51.8
02:00 - 03:00	51.1	51.8	51.6	50.4	52.8	53.8	51.7
03:00 - 04:00	51.1	51.6	51.2	50.1	52.3	54.0	51.8
04:00 - 05:00	51.0	51.7	50.6	49.8	52.3	51.2	51.6
05:00 - 06:00	50.0	52.4	51.0	50.6	52.4	50.6	51.7
06:00 - 07:00	51.1	53.1	52.9	51.9	52.6	51.0	52.4
07:00 - 08:00	54.4	50.2	58.2	56.6	53.2	52.9	53.1
08:00 - 09:00	57.8	49.0	57.6	56.4	51.5	58.2	54.4
09:00 - 10:00	57.5	49.1	57.6	55.5	50.4	57.6	57.8
10:00 - 11:00	57.0	49.1	56.0	56.2	49.1	57.6	57.5
11:00 - 12:00	57.1	49.3	56.0	54.6	48.4	56.0	63.6
12:00 - 13:00	57.5	48.7	56.4	55.9	48.1	55.9	56.2
13:00 - 14:00	57.4	48.5	56.5	56.6	48.0	47.9	49.3
14:00 - 15:00	50.3	49.2	49.3	56.0	48.3	48.7	48.7
15:00 - 16:00	51.8	50.6	50.1	57.4	49.3	53.1	48.5
L90(avg)*	53.6	50.9	54.2	53.8	52.7	54.7	55.1

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

(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 : 24 Nov 2025-01 Dec 2025

SLM Model : Cirrus CR162C

Serial No : G300832

Site Operator : Mr. Phuwadech Kaewjirakulsri

Calibrator Model : Cirrus CR:515

Serial No : 94296

Calibration Ref dB(A) : 94.0

Certified Date : 27 Feb 2025

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

Expire Date : 26 Feb 2026

Cal Sheet No.: CR-515-2025-316

Time	Equivalent Sound Pressure Level (dB(A))						
	24-25 Nov 2025	25-26 Nov 2025	26-27 Nov 2025	27-28 Nov 2025	28-29 Nov 2025	29-30 Nov 2025	30-01 Dec 2025
16:00 - 17:00	57.8	64.8	65.3	65.8	65.3	65.0	64.3
17:00 - 18:00	59.6	67.8	66.7	67.6	67.8	67.8	66.6
18:00 - 19:00	60.9	65.4	66.6	66.3	65.4	65.4	66.7
19:00 - 20:00	65.9	65.7	65.9	67.2	65.3	65.2	65.6
20:00 - 21:00	63.7	62.6	63.7	65.3	65.2	65.3	65.1
21:00 - 22:00	61.0	60.0	61.0	62.6	61.9	67.1	62.0
22:00 - 23:00	60.1	62.2	60.1	59.5	65.8	61.9	61.5
23:00 - 00:00	61.7	57.3	59.4	62.2	69.4	60.8	61.1
00:00 - 01:00	57.8	63.9	59.7	57.6	65.4	60.8	59.8
01:00 - 02:00	57.2	63.4	57.5	57.5	62.6	61.1	63.6
02:00 - 03:00	55.0	60.5	54.6	57.6	63.3	58.4	55.0
03:00 - 04:00	57.4	58.5	57.3	55.1	59.4	57.9	57.4
04:00 - 05:00	57.0	59.3	56.6	58.6	57.6	57.8	57.0
05:00 - 06:00	62.0	60.4	62.4	61.1	60.2	59.7	62.0
06:00 - 07:00	66.0	64.4	66.9	67.0	63.3	64.6	66.0
07:00 - 08:00	66.1	64.6	69.2	68.6	67.7	64.7	69.3
08:00 - 09:00	63.2	64.4	64.8	64.9	69.2	65.5	65.4
09:00 - 10:00	64.0	64.3	64.4	63.3	67.5	61.8	62.6
10:00 - 11:00	64.8	64.2	63.8	63.5	63.9	62.1	63.3
11:00 - 12:00	61.6	63.4	64.3	65.0	62.8	62.3	64.3
12:00 - 13:00	61.0	63.3	66.0	61.1	64.4	61.2	66.0
13:00 - 14:00	61.1	62.9	62.0	61.2	62.5	60.6	62.0
14:00 - 15:00	61.0	61.1	62.4	61.1	60.9	61.5	61.0
15:00 - 16:00	62.4	61.5	63.1	61.5	62.0	64.2	62.4
Leq(24)*	62.2	63.4	64.0	63.9	65.1	63.5	64.0
Ldn	67.5	68.6	68.3	68.3	70.9	68.0	68.7
Lmax **	105.9	107.9	107.8	106.1	108.5	107.9	106.5
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 : Eastern Refinery Boundary

Monitor Period : 24 Nov 2025-01 Dec 2025

SLM Model : Cirrus CR162C

Serial No : G300832

Site Operator : Mr. Phuwadech Kaewjirakulsri

Calibrator Model : Cirrus CR:515

Serial No : 94296

Calibration Ref dB(A) : 94.0

Certified Date : 27 Feb 2025

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

Expire Date : 26 Feb 2026

Cal Sheet No.: CR-515-2025-316

Time	L90 (dB(A))						
	24-25 Nov 2025	25-26 Nov 2025	26-27 Nov 2025	27-28 Nov 2025	28-29 Nov 2025	29-30 Nov 2025	30-01 Dec 2025
16:00 - 17:00	52.8	47.7	51.8	50.1	51.8	47.6	44.3
17:00 - 18:00	53.9	48.5	52.7	51.9	48.5	48.5	46.8
18:00 - 19:00	53.0	48.0	54.1	52.7	48.0	48.0	47.8
19:00 - 20:00	47.7	47.9	47.7	46.0	47.9	47.9	46.6
20:00 - 21:00	46.0	46.3	46.0	46.5	47.8	47.8	46.4
21:00 - 22:00	44.4	46.0	44.4	44.1	47.7	47.6	46.3
22:00 - 23:00	44.4	47.4	44.4	43.9	49.6	47.5	46.0
23:00 - 00:00	43.2	49.4	43.9	43.2	51.5	46.4	48.2
00:00 - 01:00	42.9	43.5	42.7	42.9	43.5	46.3	47.0
01:00 - 02:00	42.9	46.1	42.6	42.9	44.6	44.6	46.2
02:00 - 03:00	45.3	46.5	42.7	42.9	46.1	45.1	45.3
03:00 - 04:00	45.5	46.3	43.0	42.7	46.5	46.5	45.5
04:00 - 05:00	44.9	46.5	42.7	43.5	46.3	46.3	44.9
05:00 - 06:00	47.7	46.5	44.8	44.1	46.5	46.5	47.7
06:00 - 07:00	49.6	48.7	47.7	47.3	47.7	49.1	49.6
07:00 - 08:00	47.4	45.0	51.0	52.4	49.6	45.0	51.5
08:00 - 09:00	51.9	46.1	49.4	47.4	51.4	44.1	43.5
09:00 - 10:00	42.8	46.1	51.1	52.0	50.4	43.3	44.6
10:00 - 11:00	43.2	47.3	50.7	42.8	47.4	42.5	46.1
11:00 - 12:00	44.8	46.1	46.1	43.2	44.8	43.1	46.1
12:00 - 13:00	47.3	44.0	45.0	44.8	42.8	42.5	45.0
13:00 - 14:00	48.5	44.5	45.4	47.3	43.9	40.0	45.4
14:00 - 15:00	46.3	50.7	50.1	50.7	46.3	40.9	46.3
15:00 - 16:00	45.4	51.2	50.1	51.2	45.4	42.8	45.4
L90(avg)*	48.2	47.3	48.6	48.1	48.0	46.0	46.7

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

(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 1

Monitor Period : 24 Nov 2025-01 Dec 2025

SLM Model : Cirrus CR162B

Serial No : G300769

Site Operator : Mr. Phuwadech Kaewjirakulsri

Calibrator Model : Cirrus CR:515

Serial No : 94296

Calibration Ref dB(A) : 94.0

Certified Date : 27 Feb 2025

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

Expire Date : 26 Feb 2026

Cal Sheet No.: CR-515-2025-316

Time	Equivalent Sound Pressure Level (dB(A))						
	24-25 Nov 2025	25-26 Nov 2025	26-27 Nov 2025	27-28 Nov 2025	28-29 Nov 2025	29-30 Nov 2025	30-01 Dec 2025
15:00 - 16:00	60.9	60.6	60.0	59.9	60.1	60.6	59.5
16:00 - 17:00	62.8	62.4	62.1	61.8	62.4	62.4	61.5
17:00 - 18:00	63.4	61.2	62.4	61.2	62.2	61.2	61.5
18:00 - 19:00	63.0	62.5	62.6	62.0	62.8	62.6	60.4
19:00 - 20:00	62.8	62.3	63.1	62.4	62.7	62.8	61.1
20:00 - 21:00	62.4	61.5	60.9	61.5	60.7	62.4	60.9
21:00 - 22:00	59.4	58.3	58.6	59.4	58.4	60.2	59.9
22:00 - 23:00	58.6	57.9	57.9	58.4	57.9	59.6	59.9
23:00 - 00:00	58.5	58.0	57.8	58.4	57.7	59.3	59.8
00:00 - 01:00	58.7	57.9	57.9	58.5	57.8	58.5	60.3
01:00 - 02:00	57.6	56.9	56.6	62.3	56.6	62.3	59.3
02:00 - 03:00	58.3	56.8	56.6	57.3	56.5	57.3	58.8
03:00 - 04:00	58.6	57.3	57.9	56.8	56.9	58.0	58.8
04:00 - 05:00	59.2	57.3	59.6	57.1	57.5	59.1	58.8
05:00 - 06:00	63.0	58.5	60.3	58.6	57.8	60.4	59.8
06:00 - 07:00	62.8	61.7	61.6	61.4	60.3	63.0	63.0
07:00 - 08:00	64.0	63.4	63.1	63.1	61.9	64.1	64.5
08:00 - 09:00	63.8	61.9	62.2	62.3	60.1	63.8	61.9
09:00 - 10:00	62.1	60.1	60.7	61.4	57.9	62.0	61.6
10:00 - 11:00	63.1	61.1	61.1	60.0	57.8	60.7	63.2
11:00 - 12:00	62.0	63.0	60.5	60.5	59.5	60.6	62.0
12:00 - 13:00	61.0	59.7	59.0	59.4	60.5	57.8	60.9
13:00 - 14:00	61.2	59.1	60.1	59.0	60.1	56.4	60.9
14:00 - 15:00	61.0	59.7	60.1	59.8	61.1	58.1	60.1
Leq(24)*	61.6	60.4	60.5	60.5	59.9	61.0	61.0
Ldn	66.8	65.3	65.7	65.9	64.8	66.8	66.7
Lmax **	99.3	98.6	96.6	97.0	96.6	100.4	101.3
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 : 24 Nov 2025-01 Dec 2025

SLM Model : Cirrus CR162B

Serial No : G300769

Site Operator : Mr. Phuwadech Kaewjirakulsri

Calibrator Model : Cirrus CR:515

Serial No : 94296

Calibration Ref dB(A) : 94.0

Certified Date : 27 Feb 2025

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

Expire Date : 26 Feb 2026

Cal Sheet No.: CR-515-2025-316

Time	L90 (dB(A))						
	24-25 Nov 2025	25-26 Nov 2025	26-27 Nov 2025	27-28 Nov 2025	28-29 Nov 2025	29-30 Nov 2025	30-01 Dec 2025
15:00 - 16:00	57.3	56.8	56.0	56.3	56.1	56.8	55.1
16:00 - 17:00	58.5	57.9	57.3	57.6	57.8	57.9	56.1
17:00 - 18:00	59.4	57.2	58.4	57.9	58.3	57.2	56.4
18:00 - 19:00	59.2	58.3	58.3	58.2	58.3	58.6	56.2
19:00 - 20:00	58.5	57.2	57.8	57.2	57.5	58.5	56.2
20:00 - 21:00	58.1	56.2	56.3	56.8	56.1	58.1	56.8
21:00 - 22:00	57.1	55.8	55.8	56.3	55.8	57.8	57.7
22:00 - 23:00	56.6	55.8	55.0	56.0	54.9	57.9	57.9
23:00 - 00:00	56.7	56.0	55.4	56.6	55.4	57.3	58.2
00:00 - 01:00	56.9	55.8	55.5	56.1	55.5	56.2	58.6
01:00 - 02:00	56.1	55.7	55.2	56.8	55.2	56.7	58.1
02:00 - 03:00	56.2	55.8	55.3	55.8	55.3	55.8	57.7
03:00 - 04:00	56.3	55.9	55.7	55.3	55.5	56.1	57.4
04:00 - 05:00	56.3	56.0	57.4	55.1	55.8	57.2	57.1
05:00 - 06:00	60.0	56.5	56.7	56.2	56.0	57.1	57.2
06:00 - 07:00	60.4	58.4	58.5	58.0	57.3	60.4	59.1
07:00 - 08:00	61.5	60.2	60.7	60.8	59.0	61.7	61.4
08:00 - 09:00	60.1	57.7	58.9	59.2	56.1	60.3	56.9
09:00 - 10:00	58.1	56.8	56.9	57.3	55.3	58.1	56.4
10:00 - 11:00	58.8	56.9	57.2	56.4	55.3	57.1	58.6
11:00 - 12:00	58.4	58.4	56.3	57.0	56.6	56.4	58.6
12:00 - 13:00	57.0	55.9	55.7	55.8	56.0	53.1	57.0
13:00 - 14:00	56.7	55.7	56.1	55.6	56.1	52.5	56.3
14:00 - 15:00	56.4	55.5	56.2	55.5	56.5	53.9	56.2
L90(avg)*	58.2	56.9	57.0	57.0	56.5	57.7	57.6

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 : 24 Nov 2025-01 Dec 2025

SLM Model : Cirrus CR162B

Serial No : G302738

Site Operator : Mr. Phuwadech Kaewjirakulsri

Calibrator Model : Cirrus CR:515

Serial No : 94296

Calibration Ref dB(A) : 94.0

Certified Date : 27 Feb 2025

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

Expire Date : 26 Feb 2026

Cal Sheet No.: CR-515-2025-316

Time	Equivalent Sound Pressure Level (dB(A))						
	24-25 Nov 2025	25-26 Nov 2025	26-27 Nov 2025	27-28 Nov 2025	28-29 Nov 2025	29-30 Nov 2025	30-01 Dec 2025
15:00 - 16:00	56.1	56.7	62.2	60.7	58.5	59.7	59.9
16:00 - 17:00	57.6	57.3	61.8	63.0	58.8	61.2	62.3
17:00 - 18:00	59.6	58.4	61.9	58.8	59.2	62.2	62.1
18:00 - 19:00	60.9	59.2	62.3	59.0	57.5	61.9	61.5
19:00 - 20:00	61.5	58.8	61.2	58.9	55.6	61.8	61.5
20:00 - 21:00	59.9	57.3	59.0	59.1	58.0	61.1	60.8
21:00 - 22:00	56.9	55.5	56.8	56.5	56.8	58.5	59.6
22:00 - 23:00	56.4	55.0	56.6	55.9	56.6	58.2	59.8
23:00 - 00:00	56.2	55.2	56.2	55.3	56.9	59.9	60.3
00:00 - 01:00	56.5	55.0	59.4	55.3	59.6	59.4	61.9
01:00 - 02:00	55.0	54.6	56.6	55.5	59.9	56.6	60.2
02:00 - 03:00	55.0	54.6	56.1	54.7	56.6	57.0	58.3
03:00 - 04:00	55.5	55.1	54.7	54.3	57.0	57.6	58.1
04:00 - 05:00	55.3	56.2	54.4	54.7	57.3	58.3	58.9
05:00 - 06:00	56.5	56.1	55.0	55.9	59.8	59.6	60.0
06:00 - 07:00	59.0	58.4	56.6	58.3	63.4	62.3	62.6
07:00 - 08:00	59.9	59.0	61.1	59.6	64.4	62.8	64.6
08:00 - 09:00	59.0	57.3	61.0	60.7	60.5	60.8	61.9
09:00 - 10:00	58.7	56.6	59.0	61.8	58.6	59.0	59.1
10:00 - 11:00	58.3	63.0	64.6	58.2	58.0	57.9	58.1
11:00 - 12:00	58.1	56.2	56.1	58.1	58.2	59.0	57.6
12:00 - 13:00	57.0	55.5	55.5	56.9	58.1	57.8	57.3
13:00 - 14:00	57.2	64.1	63.3	57.1	58.1	56.9	63.5
14:00 - 15:00	56.3	62.3	63.8	56.2	58.6	59.1	63.6
Leq(24)*	58.0	58.3	60.1	58.4	59.1	59.9	61.0
Ldn	63.2	62.9	64.0	62.9	65.6	65.7	66.8
Lmax **	98.3	94.8	96.7	96.3	100.5	101.9	100.8
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 2

Monitor Period : 24 Nov 2025-01 Dec 2025

SLM Model : Cirrus CR162B

Serial No : G302738

Site Operator : Mr. Phuwadech Kaewjirakulsri

Calibrator Model : Cirrus CR:515

Serial No : 94296

Calibration Ref dB(A) : 94.0

Certified Date : 27 Feb 2025

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


Expire Date : 26 Feb 2026

Cal Sheet No.: CR-515-2025-316

Time	L90 (dB(A))						
	24-25 Nov 2025	25-26 Nov 2025	26-27 Nov 2025	27-28 Nov 2025	28-29 Nov 2025	29-30 Nov 2025	30-01 Dec 2025
15:00 - 16:00	53.8	54.1	55.9	54.5	55.1	53.5	53.6
16:00 - 17:00	54.7	55.1	56.9	57.3	55.5	56.0	54.9
17:00 - 18:00	56.2	55.1	55.3	56.4	55.4	55.9	55.3
18:00 - 19:00	57.0	55.7	55.5	56.2	54.3	56.9	55.1
19:00 - 20:00	55.9	54.9	55.0	54.7	53.5	56.2	54.9
20:00 - 21:00	54.4	54.3	54.8	54.3	53.9	55.6	55.5
21:00 - 22:00	53.7	53.5	53.7	53.9	53.8	55.7	56.8
22:00 - 23:00	54.0	53.6	53.9	53.4	53.9	55.6	57.5
23:00 - 00:00	53.9	53.8	54.0	53.6	54.1	57.7	58.2
00:00 - 01:00	54.2	53.5	54.7	53.4	57.3	55.3	58.3
01:00 - 02:00	53.5	53.6	54.9	53.6	55.8	55.0	58.1
02:00 - 03:00	53.7	53.5	53.8	53.5	54.9	55.4	56.5
03:00 - 04:00	54.2	53.8	53.6	53.1	55.2	56.0	56.2
04:00 - 05:00	53.9	54.1	53.1	53.6	55.9	56.5	57.2
05:00 - 06:00	54.6	54.3	53.8	54.2	56.5	57.6	56.8
06:00 - 07:00	56.3	56.2	54.5	55.9	59.6	58.3	58.8
07:00 - 08:00	57.5	56.8	57.0	57.7	60.3	57.9	60.8
08:00 - 09:00	56.0	54.3	53.6	57.1	56.3	53.5	55.9
09:00 - 10:00	55.9	54.0	52.5	56.2	55.7	52.4	54.9
10:00 - 11:00	55.6	54.2	55.4	55.7	55.6	51.9	55.6
11:00 - 12:00	55.5	53.8	53.8	55.3	52.3	51.7	54.6
12:00 - 13:00	54.2	53.2	53.2	54.1	51.9	50.2	54.0
13:00 - 14:00	54.0	54.9	54.4	54.0	51.4	48.8	54.5
14:00 - 15:00	53.6	56.6	55.0	53.6	52.2	52.1	54.7
L90(avg)*	55.0	54.6	54.7	55.0	55.6	55.4	56.6

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 : Map Ta Phut New Town

Monitor Period : 24 Nov 2025-01 Dec 2025

SLM Model : Cirrus CR161B

Serial No : G303827

Site Operator : Mr. Phuwadech Kaewjirakulsri

Calibrator Model : Cirrus CR:515

Serial No : 94296

Calibration Ref dB(A) : 94.0

Certified Date : 27 Feb 2025

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

Expire Date : 26 Feb 2026

Cal Sheet No.: CR-515-2025-316

Time	Equivalent Sound Pressure Level (dB(A))						
	24-25 Nov 2025	25-26 Nov 2025	26-27 Nov 2025	27-28 Nov 2025	28-29 Nov 2025	29-30 Nov 2025	30-01 Dec 2025
17:00 - 18:00	55.1	57.7	53.0	55.3	52.3	49.9	49.8
18:00 - 19:00	59.0	56.7	50.7	48.3	48.7	47.2	51.6
19:00 - 20:00	53.6	57.6	49.6	52.4	47.8	45.9	52.9
20:00 - 21:00	53.1	58.0	51.5	48.3	46.3	45.6	48.3
21:00 - 22:00	53.7	57.2	55.7	51.0	51.7	43.9	53.9
22:00 - 23:00	53.9	58.7	48.4	45.7	47.9	44.0	50.3
23:00 - 00:00	52.7	58.1	45.2	43.8	49.9	51.6	48.4
00:00 - 01:00	51.4	57.3	46.9	43.8	40.9	44.6	47.5
01:00 - 02:00	51.0	53.8	48.0	56.3	45.9	45.9	49.2
02:00 - 03:00	53.3	50.5	53.4	41.8	47.5	42.3	50.2
03:00 - 04:00	53.0	45.9	46.7	44.7	49.2	43.0	51.3
04:00 - 05:00	52.5	45.6	49.0	44.0	43.1	42.9	50.9
05:00 - 06:00	52.3	46.6	47.4	43.3	41.3	45.5	51.8
06:00 - 07:00	51.6	50.3	50.7	50.6	47.3	48.4	52.4
07:00 - 08:00	52.2	54.0	52.0	52.5	50.0	48.5	49.8
08:00 - 09:00	51.8	51.3	52.9	53.3	50.7	50.0	47.9
09:00 - 10:00	54.0	48.1	48.4	50.8	52.7	53.2	48.3
10:00 - 11:00	55.0	48.1	46.4	48.2	50.4	53.0	49.5
11:00 - 12:00	58.5	49.3	48.5	51.2	49.0	49.5	49.3
12:00 - 13:00	61.1	48.7	48.3	49.3	46.1	46.6	51.7
13:00 - 14:00	63.0	50.2	47.3	51.0	48.2	46.8	57.8
14:00 - 15:00	63.3	49.6	47.5	49.2	50.5	46.0	59.2
15:00 - 16:00	62.3	52.8	48.5	48.1	49.1	48.7	60.3
16:00 - 17:00	61.9	49.3	49.4	50.7	52.5	48.7	67.7
Leq(24)*	57.5	54.3	50.2	50.5	49.2	48.2	56.5
Ldn	60.7	60.8	55.8	55.8	53.9	53.3	59.1
Lmax **	92.6	96.7	96.2	97.0	97.9	93.3	97.7
Standard-24Hr	70 dB(A)						
Standard-Max	115 dB(A)						

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

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

(Miss Katesarin Vorradetwittaya)
Environmental Scientist

Preeda S.
(Miss Preeda Somjai)
Technical Management Team



Noise Monitoring Result : Background Noise

MTR-SPRC PLC-Refinery

Location : Map Ta Phut New Town

Monitor Period : 24 Nov 2025-01 Dec 2025

SLM Model : Cirrus CR161B

Serial No : G303827

Site Operator : Mr. Phuwadech Kaewjirakulsri

Calibrator Model : Cirrus CR:515

Serial No : 94296

Calibration Ref dB(A) : 94.0

Certified Date : 27 Feb 2025

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

Expire Date : 26 Feb 2026

Cal Sheet No.: CR-515-2025-316

Time	L90 (dB(A))						
	24-25 Nov 2025	25-26 Nov 2025	26-27 Nov 2025	27-28 Nov 2025	28-29 Nov 2025	29-30 Nov 2025	30-01 Dec 2025
17:00 - 18:00	47.7	55.3	45.1	42.3	41.4	41.1	45.8
18:00 - 19:00	55.5	55.1	43.9	42.0	40.8	39.6	46.5
19:00 - 20:00	35.9	55.1	44.2	46.2	40.6	40.5	46.6
20:00 - 21:00	33.5	55.5	45.8	39.4	37.3	39.7	45.3
21:00 - 22:00	49.7	53.9	46.0	39.4	36.3	39.4	44.8
22:00 - 23:00	50.0	54.9	43.3	40.6	36.0	40.0	45.7
23:00 - 00:00	45.1	54.6	41.4	37.9	36.3	39.3	45.8
00:00 - 01:00	47.7	52.2	44.6	39.2	34.6	39.2	44.9
01:00 - 02:00	48.4	40.5	44.4	38.7	33.7	39.2	46.0
02:00 - 03:00	50.0	43.6	41.3	38.8	33.5	38.9	48.0
03:00 - 04:00	51.2	43.0	43.8	39.6	34.0	39.8	48.9
04:00 - 05:00	50.6	43.5	44.0	38.5	36.6	39.5	48.9
05:00 - 06:00	50.8	44.0	44.7	38.8	36.6	40.7	49.1
06:00 - 07:00	49.6	45.4	45.2	42.7	38.6	42.3	49.5
07:00 - 08:00	49.4	46.9	45.2	46.7	39.9	42.3	44.0
08:00 - 09:00	49.1	44.0	41.1	45.3	39.3	40.9	41.8
09:00 - 10:00	50.5	42.7	40.8	42.2	40.1	39.5	41.5
10:00 - 11:00	51.1	41.5	41.3	41.9	40.1	39.3	41.9
11:00 - 12:00	52.3	41.7	40.7	41.9	39.9	42.2	42.6
12:00 - 13:00	54.6	41.9	39.9	40.8	39.0	41.5	41.3
13:00 - 14:00	54.6	42.6	39.3	41.5	39.8	39.3	43.3
14:00 - 15:00	54.6	45.4	39.9	40.3	39.2	41.5	48.7
15:00 - 16:00	54.7	43.3	39.9	41.5	40.2	44.0	41.4
16:00 - 17:00	56.1	44.5	40.3	42.3	40.0	44.4	41.4
L90(avg)*	51.6	50.6	43.3	41.9	38.7	40.9	46.0

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

(Miss Katesarin Vorradetwittaya)
Environmental Scientist

Preeda S.
(Miss Preeda Somjai)
Technical Management Team



Noise Monitoring Result : Community Noise

MTR-SPRC PLC-Refinery

Location : Soi Ruam Patana Community

Monitor Period : 24 Nov 2025-01 Dec 2025

SLM Model : Cirrus CR161B

Serial No : G303830

Site Operator : Mr. Phuwadech Kaewjirakulsri

Calibrator Model : Cirrus CR:515

Serial No : 94296

Calibration Ref dB(A) : 94.0

Certified Date : 27 Feb 2025

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

Expire Date : 26 Feb 2026

Cal Sheet No.: CR-515-2025-316

Time	Equivalent Sound Pressure Level (dB(A))						
	24-25 Nov 2025	25-26 Nov 2025	26-27 Nov 2025	27-28 Nov 2025	28-29 Nov 2025	29-30 Nov 2025	30-01 Dec 2025
17:00 - 18:00	53.1	51.4	52.2	52.9	52.3	51.4	53.9
18:00 - 19:00	54.4	56.2	55.5	53.0	52.4	54.5	52.9
19:00 - 20:00	55.9	56.8	54.7	54.5	51.0	53.8	54.5
20:00 - 21:00	54.5	55.2	50.6	52.3	50.6	51.6	52.3
21:00 - 22:00	53.5	54.0	48.6	49.7	48.6	50.7	49.2
22:00 - 23:00	54.6	53.0	48.3	49.1	48.3	49.1	48.3
23:00 - 00:00	54.5	52.5	47.4	47.3	48.7	47.4	48.7
00:00 - 01:00	55.0	51.8	48.2	48.2	48.3	48.2	51.3
01:00 - 02:00	54.3	50.9	47.5	47.5	47.4	47.2	52.6
02:00 - 03:00	54.1	50.9	47.4	47.4	43.4	47.4	48.6
03:00 - 04:00	52.9	48.4	46.1	45.9	46.1	45.9	49.9
04:00 - 05:00	50.6	48.5	47.7	48.3	47.8	48.3	53.0
05:00 - 06:00	52.0	50.9	52.0	52.2	52.1	52.2	53.9
06:00 - 07:00	54.3	53.8	53.9	54.6	52.9	53.8	54.1
07:00 - 08:00	54.5	54.2	54.2	55.5	53.2	54.2	54.5
08:00 - 09:00	51.5	51.9	52.4	52.0	51.6	51.9	52.7
09:00 - 10:00	52.0	49.9	50.5	50.9	50.6	50.5	51.0
10:00 - 11:00	50.6	50.0	51.0	51.8	48.9	51.0	49.5
11:00 - 12:00	52.3	49.5	51.7	49.7	49.1	51.5	50.6
12:00 - 13:00	51.8	50.6	51.4	50.9	50.1	51.4	49.3
13:00 - 14:00	50.6	52.0	49.2	49.1	48.0	49.5	49.3
14:00 - 15:00	50.0	49.0	49.7	49.2	49.3	49.0	50.1
15:00 - 16:00	50.8	50.9	50.3	47.4	49.9	51.3	51.3
16:00 - 17:00	50.7	50.9	51.9	51.4	50.3	51.5	50.8
Leq(24)*	53.2	52.4	51.3	51.2	50.1	51.1	51.8
Ldn	60.1	58.2	56.4	56.6	55.8	56.4	58.1
Lmax **	82.3	80.7	74.6	82.8	75.0	83.8	79.5
Standard-24Hr	70 dB(A)						
Standard-Max	115 dB(A)						

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

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

(Miss Katesarin Vorradetwittaya)
Environmental Scientist

Preeda S.
(Miss Preeda Somjai)
Technical Management Team



Noise Monitoring Result : Background Noise

MTR-SPRC PLC-Refinery

Location : Soi Ruam Patana Community

Monitor Period : 24 Nov 2025-01 Dec 2025

SLM Model : Cirrus CR161B

Serial No : G303830

Site Operator : Mr. Phuwadech Kaewjirakulsri

Calibrator Model : Cirrus CR:515

Serial No : 94296

Calibration Ref dB(A) : 94.0

Certified Date : 27 Feb 2025

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

Expire Date : 26 Feb 2026

Cal Sheet No.: CR-515-2025-316

Time	L90 (dB(A))						
	24-25 Nov 2025	25-26 Nov 2025	26-27 Nov 2025	27-28 Nov 2025	28-29 Nov 2025	29-30 Nov 2025	30-01 Dec 2025
17:00 - 18:00	46.3	46.0	46.3	47.2	45.8	45.5	46.8
18:00 - 19:00	47.2	47.7	53.9	49.4	47.9	49.8	49.2
19:00 - 20:00	53.8	55.2	46.3	49.9	46.2	50.6	50.0
20:00 - 21:00	52.8	53.8	46.0	48.5	46.0	49.2	48.7
21:00 - 22:00	50.8	52.1	45.8	47.7	45.8	48.7	46.8
22:00 - 23:00	52.9	52.0	45.0	46.6	45.0	45.0	45.0
23:00 - 00:00	53.2	50.3	45.3	45.3	45.8	45.3	45.8
00:00 - 01:00	54.1	50.7	45.3	45.3	46.9	45.2	48.0
01:00 - 02:00	52.6	49.3	44.5	44.5	41.8	42.8	47.1
02:00 - 03:00	53.1	49.1	44.8	44.8	40.6	44.8	44.1
03:00 - 04:00	50.7	46.0	42.2	43.5	42.2	43.5	45.3
04:00 - 05:00	47.9	44.1	40.8	42.4	40.8	42.4	43.8
05:00 - 06:00	48.2	45.3	42.9	43.4	42.9	43.4	47.9
06:00 - 07:00	48.8	48.5	47.8	47.5	46.5	48.5	48.4
07:00 - 08:00	48.9	48.4	48.4	49.2	47.8	48.4	47.5
08:00 - 09:00	46.9	45.5	45.9	46.5	45.8	45.6	46.6
09:00 - 10:00	46.1	44.7	45.0	46.3	42.1	45.0	46.5
10:00 - 11:00	45.2	42.4	46.3	44.9	39.8	46.3	40.3
11:00 - 12:00	45.3	41.5	42.7	43.5	38.9	43.4	39.0
12:00 - 13:00	44.2	41.7	42.4	42.5	38.9	42.3	39.1
13:00 - 14:00	45.2	40.6	42.2	41.7	38.6	42.6	43.8
14:00 - 15:00	43.8	41.9	43.8	42.1	40.0	43.8	43.8
15:00 - 16:00	44.5	44.8	43.4	42.9	41.4	45.0	44.8
16:00 - 17:00	45.5	46.0	45.3	45.0	43.6	46.5	45.5
L90(avg)*	50.0	48.8	46.2	46.1	44.3	46.3	46.4

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

(Miss Katesarin Vorradetwittaya)
Environmental Scientist

Preeda S.
(Miss Preeda Somjai)
Technical Management Team



Noise Monitoring Result : Community Noise

MTR-SPRC PLC-Refinery

Location : Wat Sophon Community

Monitor Period : 24 Nov 2025-01 Dec 2025

SLM Model : Cirrus CR161B

Serial No : G303833

Site Operator : Mr. Phuwadech Kaewjirakulsri

Calibrator Model : Cirrus CR:515

Serial No : 94296

Calibration Ref dB(A) : 94.0

Certified Date : 27 Feb 2025

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

Expire Date : 26 Feb 2026

Cal Sheet No.: CR-515-2025-316

Time	Equivalent Sound Pressure Level (dB(A))						
	24-25 Nov 2025	25-26 Nov 2025	26-27 Nov 2025	27-28 Nov 2025	28-29 Nov 2025	29-30 Nov 2025	30-01 Dec 2025
17:00 - 18:00	56.2	59.1	58.6	60.3	58.7	58.5	58.2
18:00 - 19:00	53.1	56.3	56.1	58.2	60.5	56.1	57.3
19:00 - 20:00	54.1	56.0	55.5	57.5	59.5	55.5	57.1
20:00 - 21:00	56.6	57.2	56.6	56.6	59.0	55.4	56.5
21:00 - 22:00	54.3	58.5	54.3	60.3	59.3	55.3	60.0
22:00 - 23:00	48.9	57.7	56.8	57.0	57.4	55.1	56.5
23:00 - 00:00	48.8	55.5	55.5	55.6	56.8	54.8	56.7
00:00 - 01:00	55.2	54.7	54.7	56.8	56.8	55.0	56.6
01:00 - 02:00	48.0	54.7	54.7	56.6	56.7	54.8	56.6
02:00 - 03:00	49.0	54.6	54.6	56.7	56.6	55.1	56.4
03:00 - 04:00	52.5	54.7	54.7	55.0	57.3	55.1	57.1
04:00 - 05:00	52.3	55.7	55.2	56.0	56.7	55.4	56.6
05:00 - 06:00	50.7	55.5	55.7	57.4	56.9	55.6	57.5
06:00 - 07:00	58.2	60.3	60.4	60.5	58.6	60.3	60.5
07:00 - 08:00	58.6	59.6	58.1	58.2	58.1	58.0	60.7
08:00 - 09:00	57.9	57.9	57.0	57.8	57.0	57.0	60.3
09:00 - 10:00	59.1	57.0	59.9	57.0	56.9	59.9	59.9
10:00 - 11:00	58.8	56.8	55.4	56.9	55.9	58.5	56.7
11:00 - 12:00	60.5	56.7	57.6	57.8	55.5	60.5	56.2
12:00 - 13:00	59.6	56.8	57.4	57.2	56.1	59.5	55.1
13:00 - 14:00	60.3	58.2	58.5	57.3	54.5	59.3	54.0
14:00 - 15:00	59.9	55.5	58.3	57.3	54.0	56.6	54.1
15:00 - 16:00	60.1	56.6	58.4	57.3	54.4	56.8	54.4
16:00 - 17:00	58.1	58.2	58.5	57.7	56.6	57.0	57.6
Leq(24)*	57.0	57.1	57.1	57.7	57.4	57.3	57.6
Ldn	60.6	63.0	62.9	63.7	63.6	62.8	63.8
Lmax **	89.7	87.1	90.3	89.7	82.3	90.3	92.1
Standard-24Hr	70 dB(A)						
Standard-Max	115 dB(A)						

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

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

(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 : 24 Nov 2025-01 Dec 2025

SLM Model : Cirrus CR161B

Serial No : G303833

Site Operator : Mr. Phuwadech Kaewjirakulsri

Calibrator Model : Cirrus CR:515

Serial No : 94296

Calibration Ref dB(A) : 94.0

Certified Date : 27 Feb 2025

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

Expire Date : 26 Feb 2026

Cal Sheet No.: CR-515-2025-316

Time	L90 (dB(A))						
	24-25 Nov 2025	25-26 Nov 2025	26-27 Nov 2025	27-28 Nov 2025	28-29 Nov 2025	29-30 Nov 2025	30-01 Dec 2025
17:00 - 18:00	50.2	55.4	54.4	57.1	56.7	54.3	56.3
18:00 - 19:00	50.0	55.0	54.3	56.9	56.7	54.3	56.4
19:00 - 20:00	49.2	54.8	54.4	54.5	56.6	54.4	56.1
20:00 - 21:00	48.2	54.6	48.2	48.2	56.6	54.3	55.8
21:00 - 22:00	47.1	54.8	47.1	56.0	56.7	54.3	55.9
22:00 - 23:00	47.0	54.9	48.1	55.1	56.5	54.2	55.8
23:00 - 00:00	46.8	54.4	54.4	54.4	56.3	54.2	56.1
00:00 - 01:00	46.8	54.2	54.2	56.3	56.3	54.2	55.9
01:00 - 02:00	46.4	54.3	54.3	56.3	56.3	54.1	56.0
02:00 - 03:00	46.9	54.2	54.2	56.2	56.2	54.4	55.9
03:00 - 04:00	47.0	54.2	54.2	54.6	56.3	54.6	55.9
04:00 - 05:00	47.2	54.4	54.5	55.0	56.3	54.9	56.0
05:00 - 06:00	48.0	54.6	54.6	56.5	56.4	54.8	56.5
06:00 - 07:00	51.6	55.5	55.7	57.4	56.8	55.5	57.4
07:00 - 08:00	53.1	56.0	57.0	54.1	57.0	56.9	57.5
08:00 - 09:00	52.6	55.5	56.3	52.3	56.3	56.3	56.6
09:00 - 10:00	51.8	55.2	56.0	55.2	56.1	56.0	56.0
10:00 - 11:00	52.7	53.6	54.1	53.7	54.2	53.0	54.9
11:00 - 12:00	54.5	53.4	53.8	56.1	54.4	54.5	53.3
12:00 - 13:00	54.5	53.6	56.0	56.0	53.6	54.5	53.2
13:00 - 14:00	57.1	53.1	56.7	56.1	53.2	55.9	53.3
14:00 - 15:00	56.5	53.3	57.2	56.2	53.2	55.7	53.3
15:00 - 16:00	56.2	53.6	57.4	56.3	53.5	55.8	53.5
16:00 - 17:00	55.2	55.2	57.6	56.5	53.9	56.1	54.1
L90(avg)*	52.2	54.6	55.0	55.6	55.8	55.0	55.7

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

(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 สิงหาคม 2568)

ชนิดของแพลงก์ตอน	ปริมาณแพลงก์ตอน (หน่วยต่อลูกบาศก์เมตร)			
	S1	S2	S3	S4
แพลงก์ตอนพืช				
Division Cyanophyta				
Class Cyanophyceae				
Order Nostocales				
Family Oscillatoriaceae				
<i>Oscillatoria</i> sp.	17,000	-	47,000	8,000
<i>Oscillatoria tenuis</i>	8,000	31,000	-	8,000
Family Nostocaceae				
<i>Pseudanabaena</i> sp.	-	-	-	17,000
Family Rivulariaceae				
<i>Calothrix</i> sp.	8,000	-	-	-
Division Chromophyta				
Class Bacillariophyceae				
Order Biddulphales				
Suborder Coscinodiscineae				
Family Thalassiosiraceae				
<i>Cyclotella meneghiniana</i>	-	-	132,000	-
<i>Cyclotella striata</i>	825,000	627,000	302,000	33,000

ตาราง ผลการวิเคราะห์แพลงก์ตอนพืชและแพลงก์ตอนสัตว์ (เก็บตัวอย่างวันที่ 5 สิงหาคม 2568)
(ต่อ)

ชนิดของแพลงก์ตอน	ปริมาณแพลงก์ตอน (หน่วยต่อลูกบาศก์เมตร)			
	S1	S2	S3	S4
<i>Skeletonema costatum</i>	673,200,000	105,890,000	480,901,000	598,000
<i>Thalassiosira eccentrica</i>	-	-	-	8,000
<i>Thalassiosira</i> sp.	330,000	376,000	832,000	-
Family Melosiraceae				
<i>Melosira dubia</i>	-	-	104,000	-
<i>Melosira moniliformis</i>	-	-	104,000	-
<i>Melosira nummuloides</i>	-	-	-	133,000
<i>Paralia sulcata</i>	-	21,000	19,000	-
Family Aulacoseiraceae				
<i>Aulacodiscus kittoni</i>	8,000	-	-	-
Family Leptocylindraceae				
<i>Corethron criophilum</i>	8,000	21,000	-	-
Family Coscinodiscaceae				
<i>Coscinodiscus granii</i>	8,000	-	-	17,000
<i>Coscinodiscus</i> sp.	8,000	-	28,000	-
<i>Coscinodiscus wailesii</i>	8,000	-	-	8,000
Family Asterolampraceae				
<i>Asteromphalus flabellatus</i>	8,000	-	-	17,000
Family Heliopeltaceae				
<i>Actinoptychus senarius</i>	25,000	167,000	416,000	91,000
Suborder Rhizosoleniineae				
Family Rhizosoleniaceae				
<i>Guinardia delicatula</i>	-	10,000	-	-
<i>Guinardia flaccida</i>	-	-	-	17,000
<i>Guinardia striata</i>	8,000	21,000	-	17,000
<i>Proboscia alata</i>	8,000	10,000	-	83,000
<i>Pseudosolenia calcar-avis</i>	-	-	-	8,000

ตาราง ผลการวิเคราะห์แพลงก์ตอนพืชและแพลงก์ตอนสัตว์ (เก็บตัวอย่างวันที่ 5 สิงหาคม 2568)

(ต่อ)

ชนิดของแพลงก์ตอน	ปริมาณแพลงก์ตอน (หน่วยต่อลูกบาศก์เมตร)			
	S1	S2	S3	S4
<i>Rhizosolenia imbricata</i>	-	-	-	8,000
<i>Rhizosolenia striata</i>	-	-	9,000	-
Suborder Biddulphiineae				
Family Hemiaulaceae				
<i>Cerataulina bicornis</i>	41,000	-	-	33,000
<i>Cerataulina pelagica</i>	146,000	42,000	-	266,000
<i>Climacosphaenia moniligera</i>	-	10,000	-	-
<i>Hemiaulus membranaceus</i>	-	-	-	8,000
Family Chaetoceraceae				
<i>Bacteriastrum delicatulum</i>	-	219,000	19,000	8,000
<i>Bacteriastrum furcatum</i>	25,000	-	-	8,000
<i>Bacteriastrum</i> sp.	-	-	38,000	-
<i>Chaetoceros affinis</i>	-	21,000	-	8,000
<i>Chaetoceros borealis</i>	-	-	9,000	-
<i>Chaetoceros coarctatus</i>	-	-	9,000	17,000
<i>Chaetoceros compressus</i>	-	21,000	-	33,000
<i>Chaetoceros costatus</i>	-	-	-	25,000
<i>Chaetoceros curvisetus</i>	17,000	209,000	-	25,000
<i>Chaetoceros didymus</i>	-	-	9,000	-
<i>Chaetoceros diversus</i>	165,000	63,000	19,000	232,000
<i>Chaetoceros laciniosus</i>	-	-	-	33,000
<i>Chaetoceros lorenzianus</i>	124,000	21,000	-	100,000
<i>Chaetoceros mitra</i>	-	-	-	8,000
<i>Chaetoceros peruvianus</i>	-	-	-	17,000
<i>Chaetoceros pseudocurvisetus</i>	-	-	-	299,000
<i>Chaetoceros radicans</i>	-	31,000	9,000	-
<i>Chaetoceros</i> sp.	594,000	460,000	170,000	1,494,000
<i>Chaetoceros subtilis</i>	206,000	-	76,000	17,000

ตาราง ผลการวิเคราะห์แพลงก์ตอนพืชและแพลงก์ตอนสัตว์ (เก็บตัวอย่างวันที่ 5 สิงหาคม 2568)
(ต่อ)

ชนิดของแพลงก์ตอน	ปริมาณแพลงก์ตอน (หน่วยต่อลูกบาศก์เมตร)			
	S1	S2	S3	S4
Family Lithodesmaceae				
<i>Bellerochea horologicalis</i>	-	21,000	-	-
<i>Ditylum brightwellii</i>	-	-	38,000	17,000
Family Eupodiscaceae				
<i>Odontella aurita</i>	-	42,000	9,000	-
<i>Odontella mobiliensis</i>	-	31,000	9,000	-
Order Bacillariales				
Suborder Fragilariineae				
Family Fragilariaceae				
<i>Fragilaria capucina</i>	-	-	28,000	-
Family Thalassionemataceae				
<i>Thalassionema frauenfeldii</i>	132,000	251,000	113,000	91,000
<i>Thalassionema nitzschioides</i>	297,000	920,000	340,000	266,000
Family Licmophoriaceae				
<i>Licmophora abbreviata</i>	-	-	-	8,000
Family Striatellaceae				
<i>Striatella unipunctata</i>	462,000	418,000	454,000	-
Suborder Bacillariineae				
Family Achnanthaceae				
<i>Achnanthes longipes</i>	17,000	-	-	-
<i>Cocconeis scutellum</i>	25,000	21,000	19,000	8,000
Family Lyrellaceae				
<i>Lyrella lyra</i>	8,000	-	-	-
Family Naviculaceae				
<i>Amphora exigua</i>	-	-	-	8,000
<i>Amphora</i> sp.	33,000	73,000	9,000	17,000
<i>Amphora robusta</i>	-	125,000	-	149,000

ตาราง ผลการวิเคราะห์แพลงก์ตอนพืชและแพลงก์ตอนสัตว์ (เก็บตัวอย่างวันที่ 5 สิงหาคม 2568)

(ต่อ)

ชนิดของแพลงก์ตอน	ปริมาณแพลงก์ตอน (หน่วยต่อลูกบาศก์เมตร)			
	S1	S2	S3	S4
<i>Diploneis bombus</i>	-	21,000	-	8,000
<i>Diploneis smithii</i>	8,000	10,000	-	17,000
<i>Gyrosigma balticum</i>	-	105,000	-	-
<i>Meuniera membranacea</i>	-	-	-	199,000
<i>Navicula cuspidata</i>	91,000	10,000	9,000	8,000
<i>Navicula lanceolata</i>	-	-	-	8,000
<i>Navicula</i> sp.	8,000	-	-	-
<i>Navicula viridula</i>	8,000	-	-	-
<i>Pinnularia viridis</i>	-	10,000	-	-
<i>Plagiotripis pusilla</i>	-	-	-	8,000
<i>Pleurosigma aestuarii</i>	17,000	-	9,000	-
<i>Pleurosigma angulatum</i>	132,000	21,000	113,000	100,000
<i>Pleurosigma elongatum</i>	8,000	-	95,000	-
<i>Pleurosigma normanii</i>	25,000	21,000	-	8,000
<i>Pleurosigma</i> sp.	17,000	-	19,000	-
<i>Trachyneis</i> sp.	33,000	-	-	-
Family Bacillariaceae				
<i>Bacillaria paxillifer</i>	396,000	-	227,000	33,000
<i>Cylindrotheca closterium</i>	34,106,000	13,930,000	26,460,000	-
<i>Nitzschia lorenziana</i>	17,000	10,000	-	100,000
<i>Nitzschia reversa</i>	-	10,000	-	-
<i>Nitzschia</i> sp.	-	21,000	19,000	-
<i>Pseudo-nitzschia</i> sp.	42,900,000	32,050,000	40,323,000	-
Family Surirellaceae				
<i>Entomoneis alata</i>	-	-	151,000	33,000
<i>Entomoneis robusta</i>	-	31,000	19,000	17,000
<i>Surirella ovata</i>	17,000	-	-	-
<i>Surirella</i> sp.	-	10,000	-	-

ตาราง ผลการวิเคราะห์แพลงก์ตอนพืชและแพลงก์ตอนสัตว์ (เก็บตัวอย่างวันที่ 5 สิงหาคม 2568)
(ต่อ)

ชนิดของแพลงก์ตอน	ปริมาณแพลงก์ตอน (หน่วยต่อลูกบาศก์เมตร)			
	S1	S2	S3	S4
Class Dictyochophyceae				
Order Dictyochales				
Family Dictyochophyceae				
<i>Dictyocha fibula</i>	-	10,000	-	8,000
Class Dinophyceae				
Order Prorocentrales				
Family Prorocentraceae				
<i>Prorocentrum mexicanum</i>	-	10,000	-	-
<i>Prorocentrum sigmoides</i>	25,000	-	-	-
Order Gymnodiniales				
Family Gymnodinium				
<i>Gyrodinium</i> sp.	-	-	-	8,000
Order Noctilucales				
Family Noctilucaeae				
<i>Noctiluca scintillans</i>	-	21,000	-	-
Order Gonyaulacalea				
Family Ceratiaceae				
<i>Ceratium furca</i>	-	21,000	-	-
Family Gonyaulacaceae				
<i>Gonyaulax</i> sp.	-	-	19,000	17,000
Order Peridinales				
Family Calciodinellaceae				
<i>Scrippsiella trochoidea</i>	198,000	157,000	-	-
Family Peridiniaceae				
<i>Peridinium quinquecorne</i>	8,000	21,000	9,000	-
Family Protoperidiniaceae				
<i>Protoperidinium conicum</i>	8,000	-	-	-

ตาราง ผลการวิเคราะห์แพลงก์ตอนพืชและแพลงก์ตอนสัตว์ (เก็บตัวอย่างวันที่ 5 สิงหาคม 2568)

(ต่อ)

ชนิดของแพลงก์ตอน	ปริมาณแพลงก์ตอน (หน่วยต่อลูกบาศก์เมตร)			
	S1	S2	S3	S4
<i>Protoperidinium curtipes</i>	-	-	-	8,000
<i>Protoperidinium depressum</i>	-	-	-	8,000
<i>Protoperidinium latispinum</i>	8,000	10,000	-	-
<i>Protoperidinium pellucidum</i>	-	10,000	9,000	8,000
<i>Protoperidinium</i> sp.	8,000	21,000	19,000	-
แพลงก์ตอนสัตว์				
Phylum Protozoa				
Subphylum Plasmodroma				
Class Sarcodina				
Subclass Rhizopoda				
Order Testacida				
Family Arcellidae				
<i>Arcella</i> sp.	-	-	-	8,000
Subphylum Ciliophora				
Class Ciliata				
Subclass Spirotricha				
Order Tintinnida				
Family Tintinnididae				
<i>Leptotintinnus nordqvisti</i>	-	-	67,000	-
Family Codonellidae				
<i>Tintinnopsis beroidea</i>	-	84,000	19,000	8,000
<i>Tintinnopsis gracilis</i>	-	-	19,000	-
<i>Tintinnopsis loricata</i>	-	10,000	-	-
<i>Tintinnopsis meunieri</i>	-	-	274,000	-
<i>Tintinnopsis</i> sp.	-	10,000	-	-
<i>Tintinnopsis tocaninensis</i>	-	-	-	8,000

ตาราง ผลการวิเคราะห์แพลงก์ตอนพืชและแพลงก์ตอนสัตว์ (เก็บตัวอย่างวันที่ 5 สิงหาคม 2568)
(ต่อ)

ชนิดของแพลงก์ตอน	ปริมาณแพลงก์ตอน (หน่วยต่อลูกบาศก์เมตร)			
	S1	S2	S3	S4
Family Codonellopsidae				
<i>Stenosemella nivalis</i>	8,000	10,000	-	8,000
Family Petalotrichidae				
<i>Metacylis mereschkowskii</i>	-	-	-	8,000
Family Tintinnidae				
<i>Amphorella infundibulum</i>	-	-	-	8,000
Subclass Peritricha				
Order Peritrichida				
<i>Vorticella</i> sp.	-	-	-	8,000
Phylum Rotifera				
Class Monogononta				
Order Ploima				
Family Synchaetidae				
<i>Synchaeta tremula</i>	-	-	-	8,000
Class Digononta				
Family Philodinidae				
<i>Philodina</i> sp.	-	31,000	-	-
Phylum Arthropoda				
Class Crustacea				
Subclass Ostracoda				
Order Podocopa				
Family Cypridae				
<i>Cypridopsis</i> sp.	8,000	-	-	-
Subclass Copepoda				
Copepod nauplius	140,000	188,000	444,000	58,000
Order Calanoida				
Calaniod copepod	-	-	28,000	-

ตาราง ผลการวิเคราะห์แพลงก์ตอนพืชและแพลงก์ตอนสัตว์ (เก็บตัวอย่างวันที่ 5 สิงหาคม 2568)

(ต่อ)

ชนิดของแพลงก์ตอน	ปริมาณแพลงก์ตอน (หน่วยต่อลูกบาศก์เมตร)			
	S1	S2	S3	S4
Order Cyclopoida				
Cyclopoid copepod	17,000	-	76,000	8,000
Order Harpacticoida				
Harpacticoid copepod	8,000	31,000	19,000	8,000
Subclass Cirripedia				
Cirripede nauplius	8,000	-	-	-
Phylum Chordata				
Subphylum Urochordata				
Class Larvacea				
Family Oikopleuridae				
<i>Oikopleura</i> sp.	-	31,000	19,000	17,000
ชนิดของแพลงก์ตอนพืช	51	52	44	60
ชนิดของแพลงก์ตอนสัตว์	6	8	9	12
ชนิดแพลงก์ตอนรวม	57	60	53	72
ปริมาณแพลงก์ตอนพืช	754,807,000	156,714,000	551,771,000	4,862,000
ปริมาณแพลงก์ตอนสัตว์	189,000	395,000	965,000	155,000
ปริมาณแพลงก์ตอนรวม	754,996,000	157,109,000	552,736,000	5,017,000
ค่าดัชนีความหลากหลายแพลงก์ตอนพืช	0.4536	1.0024	0.5142	2.8168
ค่าดัชนีความหลากหลายแพลงก์ตอนสัตว์	0.9744	1.5610	1.5121	2.1400
ค่าดัชนีความสม่ำเสมอแพลงก์ตอนพืช	0.1154	0.2537	0.1359	0.6880
ค่าดัชนีความสม่ำเสมอแพลงก์ตอนสัตว์	0.5438	0.7507	0.6882	0.8612

(นางสาวกนกวรรณ ขาวด่อน)

ผู้วิเคราะห์

(นายอภินันท์ อินทรชาติ)

หัวหน้าสถานีวิจัยประมงศรีราชา



สถานีวิจัยประมงศรีราชา

101/12 หมู่ 9 ต. บางพระ

อ. ศรีราชา จ. ชลบุรี 20110

โทร./โทรสาร. (038) 311379

รายงานผลการวิเคราะห์สัตว์หน้าดิน


ตาราง ผลการวิเคราะห์สัตว์หน้าดิน (เก็บตัวอย่างวันที่ 5 สิงหาคม 2568)

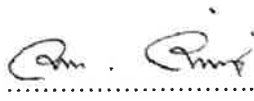
สกุลสัตว์หน้าดิน	ปริมาณสัตว์หน้าดิน (ตัวต่อตารางเมตร)			
	S1	S2	S3	S4
Phylum Annelida				
Class Polychaeta				
Order Capitellida				
Family Capitellidae				
<i>Heteromastus</i> sp. (ไส้เดือนทะเล)	-	15	-	15
Order Cirratulida				
Family Paraonidae				
<i>Paraonis</i> sp. (ไส้เดือนทะเล)	-	15	-	-
Order Eunicida				
Family Eunicidae				
<i>Marphysa</i> sp. (ไส้เดือนทะเล)	-	-	15	60
Order Opheliida				
Family Opheliidae				
<i>Armandia</i> sp. (ไส้เดือนทะเล)	15	-	-	-
Order Phyllodocida				
Family Nephtyidae				
<i>Nephtys</i> sp. (ไส้เดือนทะเล)	-	15	-	15

ตาราง ผลการวิเคราะห์สัตว์หน้าดิน (เก็บตัวอย่างวันที่ 5 สิงหาคม 2568)(ต่อ)

สกุลสัตว์หน้าดิน	ปริมาณสัตว์หน้าดิน (ตัวต่อตารางเมตร)			
	S1	S2	S3	S4
Phylum Mollusca Class Gastropoda Order Caenogastropoda Family Potamididae <i>Cerithidea</i> sp. (หอยจู้บแจ่ง) Class Bivalvia Order Cardiida Family Tellinidae <i>Tellina</i> sp. (หอยสองฝาชนิดหนึ่ง)	30	-	-	-
Phylum Chordata Class Leptocardii Order Amphioxiformes Family Branchiostomidae <i>Branchiostoma</i> sp. (แอมฟิออกซ์ส)	30	-	15	-
สกุลสัตว์หน้าดิน	4	3	3	3
ปริมาณสัตว์หน้าดิน	90	45	60	90
ค่าดัชนีความหลากหลายสัตว์หน้าดิน	1.3297	1.0986	1.0397	0.8676

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


 (นายอรรถวุฒิ กันทะวงศ์)
 ผู้วิเคราะห์


 (นายอลงกต อินทรชาติ)
 หัวหน้าสถานีวิจัยประมงศรีราชา



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

รายงานผลการวิเคราะห์แพลงก์ตอนพืชและแพลงก์ตอนสัตว์
ตาราง ผลการวิเคราะห์แพลงก์ตอนพืชและแพลงก์ตอนสัตว์ (เก็บตัวอย่างวันที่ 3 ธันวาคม 2568)

ชนิดของแพลงก์ตอน	ปริมาณแพลงก์ตอน (หน่วยต่อลูกบาศก์เมตร)			
	S1	S2	S3	S4
แพลงก์ตอนพืช				
Division Cyanophyta				
Class Cyanophyceae				
Order Nostocales				
Family Oscillatoriaceae				
<i>Oscillatoria tenuis</i>	770,000	170,000	97,000	793,000
Family Nostocaceae				
<i>Pseudanabaena</i> sp.	34,000	26,000	18,000	25,000
<i>Richelia intracellularis</i>	43,000	136,000	-	251,000
Division Chlorophyta				
Class Chlorophyceae				
Order Chlorococcales				
Family Scenedesmaceae				
<i>Scenedesmus opoliensis</i>	9,000	-	26,000	-
<i>Scenedesmus</i> sp.	-	-	18,000	-
Order Zygnematales				
Family Desmidiaceae				
<i>Closterium ehrenbergii</i>	-	-	9,000	-

ตาราง ผลการวิเคราะห์แพลงก์ตอนพืชและแพลงก์ตอนสัตว์ (เก็บตัวอย่างวันที่ 3 ธันวาคม 2568)
(ต่อ)

ชนิดของแพลงก์ตอน	ปริมาณแพลงก์ตอน (หน่วยต่อลูกบาศก์เมตร)			
	S1	S2	S3	S4
<i>Micrasterias mahabuleshwarensis</i>	-	-	9,000	-
<i>Staurostrum</i> sp.	9,000	-	-	-
Class Euglenophyceae				
Order Euglenales				
Family Euglenaceae				
<i>Euglena acus</i>	-	-	35,000	-
Division Chromophyta				
Class Bacillariophyceae				
Order Biddulphales				
Suborder Coscinodiscineae				
Family Thalassiosiraceae				
<i>Cyclotella striata</i>	-	17,000	-	-
<i>Lauderia annulata</i>	599,000	893,000	-	1,461,000
<i>Skeletonema costatum</i>	12,141,000	2,049,000	32,032,000	735,000
<i>Thalassiosira anguste-lineata</i>	-	43,000	-	50,000
<i>Thalassiosira eccentrica</i>	94,000	94,000	88,000	125,000
<i>Thalassiosira hendeyi</i>	9,000	-	18,000	42,000
<i>Thalassiosira</i> sp.	17,000	-	26,000	-
Family Melosiraceae				
<i>Melosira dubia</i>	-	-	26,000	-
Family Coscinodiscaceae				
<i>Coscinodiscus</i> sp.	-	85,000	-	8,000
Family Asterolampraceae				
<i>Asterolampra marylandica</i>	9,000	-	-	8,000
Family Heliopeltaceae				
<i>Actinoptychus grundleri</i>	-	-	-	8,000

ตาราง ผลการวิเคราะห์แพลงก์ตอนพืชและแพลงก์ตอนสัตว์ (เก็บตัวอย่างวันที่ 3 ธันวาคม 2568)
(ต่อ)

ชนิดของแพลงก์ตอน	ปริมาณแพลงก์ตอน (หน่วยต่อลูกบาศก์เมตร)			
	S1	S2	S3	S4
Suborder Rhizosoleniineae				
Family Rhizosoleniaceae				
<i>Dactylosolen fragilissimus</i>	17,000	-	-	-
<i>Guinardia delicatula</i>	17,000	-	-	-
<i>Guinardia flaccida</i>	9,000	9,000	9,000	25,000
<i>Guinardia striata</i>	436,000	94,000	-	1,019,000
<i>Proboscia alata</i>	103,000	238,000	-	1,503,000
<i>Pseudosolenia calcar-avis</i>	17,000	230,000	26,000	117,000
<i>Rhizosolenia acuminata</i>	17,000	230,000	-	301,000
<i>Rhizosolenia imbricata</i>	-	-	-	8,000
<i>Rhizosolenia pungens</i>	2,437,000	808,000	13,728,000	1,086,000
<i>Rhizosolenia setigera</i>	898,000	298,000	405,000	635,000
<i>Rhizosolenia striata</i>	9,000	187,000	-	67,000
<i>Rhizosolenia styliformis</i>	26,000	213,000	-	710,000
Suborder Biddulphiineae				
Family Hemiaulaceae				
<i>Cerataulina pelagica</i>	86,000	9,000	-	-
<i>Eucampia zodiacus</i>	-	9,000	-	-
<i>Hemiaulus hauckii</i>	128,000	-	246,000	17,000
<i>Hemiaulus indicus</i>	17,000	204,000	176,000	585,000
<i>Hemiaulus membranaceus</i>	17,000	-	-	-
<i>Hemiaulus sinensis</i>	-	34,000	-	-
Family Chaetoceraceae				
<i>Bacteriastrum delicatulum</i>	-	102,000	167,000	643,000
<i>Bacteriastrum elongatum</i>	17,000	119,000	-	100,000
<i>Bacteriastrum furcatum</i>	402,000	425,000	106,000	2,171,000
<i>Bacteriastrum</i> sp.	479,000	935,000	132,000	1,486,000

ตาราง ผลการวิเคราะห์แพลงก์ตอนพืชและแพลงก์ตอนสัตว์ (เก็บตัวอย่างวันที่ 3 ธันวาคม 2568)

(ต่อ)

ชนิดของแพลงก์ตอน	ปริมาณแพลงก์ตอน (หน่วยต่อลูกบาศก์เมตร)			
	S1	S2	S3	S4
<i>Chaetoceros affinis</i>	-	34,000	-	17,000
<i>Chaetoceros borealis</i>	445,000	2,040,000	53,000	2,054,000
<i>Chaetoceros castracanei</i>	9,000	9,000	-	-
<i>Chaetoceros compressus</i>	19,494,000	5,270,000	2,112,000	1,837,000
<i>Chaetoceros concavicornis</i>	633,000	17,000	9,000	-
<i>Chaetoceros costatus</i>	1,043,000	1,530,000	194,000	1,503,000
<i>Chaetoceros curvisetus</i>	20,691,000	12,750,000	30,096,000	17,869,000
<i>Chaetoceros danicus</i>	162,000	26,000	-	-
<i>Chaetoceros decipiens</i>	17,000	-	-	-
<i>Chaetoceros densus</i>	94,000	26,000	9,000	84,000
<i>Chaetoceros diadema</i>	-	9,000	-	-
<i>Chaetoceros didymus</i>	2,266,000	2,737,000	563,000	2,380,000
<i>Chaetoceros diversus</i>	9,000	26,000	18,000	8,000
<i>Chaetoceros laciniosus</i>	1,710,000	442,000	132,000	1,628,000
<i>Chaetoceros lauderi</i>	402,000	102,000	18,000	635,000
<i>Chaetoceros lorenzianus</i>	795,000	621,000	282,000	810,000
<i>Chaetoceros mitra</i>	616,000	77,000	18,000	200,000
<i>Chaetoceros peruvianus</i>	428,000	782,000	141,000	2,029,000
<i>Chaetoceros pseudocurvisetus</i>	2,411,000	723,000	3,344,000	676,000
<i>Chaetoceros radicans</i>	2,078,000	1,700,000	246,000	2,689,000
<i>Chaetoceros rostratus</i>	-	621,000	97,000	693,000
<i>Chaetoceros</i> sp.	5,643,000	3,740,000	387,000	3,190,000
<i>Chaetoceros teres</i>	410,000	77,000	9,000	693,000
<i>Chaetoceros tortissimus</i>	86,000	9,000	-	125,000
Family Lithodesmaceae				
<i>Helicotheca tamesis</i>	17,000	34,000	-	-
Family Eupodiscaceae				
<i>Odontella aurita</i>	9,000	9,000	-	-

ตาราง ผลการวิเคราะห์แพลงก์ตอนพืชและแพลงก์ตอนสัตว์ (เก็บตัวอย่างวันที่ 3 ธันวาคม 2568)

(ต่อ)

ชนิดของแพลงก์ตอน	ปริมาณแพลงก์ตอน (หน่วยต่อลูกบาศก์เมตร)			
	S1	S2	S3	S4
<i>Odontella mobiliensis</i>	17,000	17,000	9,000	-
<i>Odontella sinensis</i>	-	-	9,000	-
<i>Triceratium</i> sp.	-	-	9,000	-
Order Bacillariales				
Suborder Fragilariineae				
Family Thalassionemataceae				
<i>Thalassionema bacillare</i>	-	9,000	-	-
<i>Thalassionema frauenfeldii</i>	410,000	85,000	299,000	267,000
<i>Thalassionema nitzschioides</i>	684,000	774,000	317,000	84,000
Suborder Bacillariineae				
Family Achnantheaceae				
<i>Achnanthes</i> sp.	-	-	-	8,000
Family Naviculaceae				
<i>Amphipleura rutilans</i>	-	-	9,000	-
<i>Amphora exigua</i>	-	-	-	8,000
<i>Amphora robusta</i>	9,000	128,000	-	33,000
<i>Diploneis smithii</i>	-	9,000	-	25,000
<i>Gyrosigma scalproides</i>	-	-	97,000	8,000
<i>Navicula</i> sp.	17,000	34,000	-	25,000
<i>Pinnularia</i> sp.	9,000	9,000	9,000	-
<i>Pinnularia viridis</i>	-	-	18,000	-
<i>Plagiotropis pusilla</i>	-	-	-	8,000
<i>Pleurosigma aestuarii</i>	-	-	-	8,000
<i>Pleurosigma angulatum</i>	2,189,000	221,000	106,000	200,000
<i>Pleurosigma directum</i>	9,000	26,000	-	17,000
<i>Pleurosigma elongatum</i>	86,000	187,000	35,000	701,000
<i>Pleurosigma normanii</i>	9,000	17,000	-	92,000

ตาราง ผลการวิเคราะห์แพลงก์ตอนพืชและแพลงก์ตอนสัตว์ (เก็บตัวอย่างวันที่ 3 ธันวาคม 2568)
(ต่อ)

ชนิดของแพลงก์ตอน	ปริมาณแพลงก์ตอน (หน่วยต่อลูกบาศก์เมตร)			
	S1	S2	S3	S4
<i>Pleurosigma</i> sp.	17,000	-	-	106,000
<i>Sellaphora</i> sp.	-	-	9,000	-
<i>Trachyneis</i> sp.	-	26,000	-	134,000
Family Bacillariaceae				
<i>Bacillaria paxillifer</i>	17,000	17,000	211,000	-
<i>Cylindrotheca closterium</i>	17,000	782,000	9,000	17,000
<i>Nitzschia lorenziana</i>	-	17,000	-	17,000
<i>Nitzschia sigma</i>	-	17,000	-	-
<i>Nitzschia sigmoidea</i>	-	9,000	-	8,000
<i>Nitzschia</i> sp.	-	-	-	17,000
<i>Pseudo-nitzschia heimii</i>	616,000	102,000	18,000	743,000
<i>Pseudo-nitzschia pungens</i>	428,000	204,000	18,000	710,000
<i>Pseudo-nitzschia</i> sp.	795,000	612,000	88,000	752,000
Family Surirellaceae				
<i>Entomoneis alata</i>	-	-	-	8,000
Class Dictyochophyceae				
Order Dictyochales				
Family Dictyochophyceae				
<i>Dictyocha speculum</i>	-	-	9,000	-
Class Dinophyceae				
Order Prorocentrales				
Family Prorocentraceae				
<i>Prorocentrum mexicanum</i>	9,000	-	-	-
<i>Prorocentrum micans</i>	9,000	9,000	-	-
<i>Prorocentrum sigmoides</i>	9,000	-	-	-

ตาราง ผลการวิเคราะห์แพลงก์ตอนพืชและแพลงก์ตอนสัตว์ (เก็บตัวอย่างวันที่ 3 ธันวาคม 2568)
(ต่อ)

ชนิดของแพลงก์ตอน	ปริมาณแพลงก์ตอน (หน่วยต่อลูกบาศก์เมตร)			
	S1	S2	S3	S4
Order Noctilucales				
Family Noctilucaeae				
<i>Noctiluca scintillans</i>	26,000	-	-	17,000
Order Gonyaulacalea				
Family Ceratiaceae				
<i>Ceratium deflexum</i>	-	-	-	8,000
<i>Ceratium furca</i>	-	-	-	25,000
<i>Ceratium fusus</i>	9,000	-	-	25,000
<i>Ceratium macroceros</i>	17,000	26,000	-	125,000
Family Goniodomaceae				
<i>Goniodoma polyedricum</i>	9,000	-	-	-
Family Gonyaulacaceae				
<i>Gonyaulax</i> sp.	9,000	26,000	-	-
Family Pyrophacaceae				
<i>Pyrophacus horologium</i>	26,000	-	-	17,000
Order Peridiniales				
Family Calciodinellaceae				
<i>Scrippsiella trochoidea</i>	17,000	51,000	9,000	25,000
Family Peridiniaceae				
<i>Peridinium quinquecorne</i>	-	-	9,000	-
Family Protoperidiniaceae				
<i>Protoperidinium angustum</i>	26,000	9,000	-	-
<i>Protoperidinium conicum</i>	-	43,000	-	8,000
<i>Protoperidinium curtipes</i>	-	9,000	-	-
<i>Protoperidinium depressum</i>	17,000	-	-	25,000
<i>Protoperidinium latispinum</i>	-	-	-	17,000
<i>Protoperidinium minutum</i>	-	-	-	8,000

ตาราง ผลการวิเคราะห์แพลงก์ตอนพืชและแพลงก์ตอนสัตว์ (เก็บตัวอย่างวันที่ 3 ธันวาคม 2568)
(ต่อ)

ชนิดของแพลงก์ตอน	ปริมาณแพลงก์ตอน (หน่วยต่อลูกบาศก์เมตร)			
	S1	S2	S3	S4
<i>Protoperidinium oceanicum</i>	-	17,000	-	-
<i>Protoperidinium pellucidum</i>	17,000	-	-	8,000
<i>Protoperidinium</i> sp.	205,000	60,000	-	-
<i>Protoperidinium spinulosum</i>	-	9,000	-	33,000
แพลงก์ตอนสัตว์				
Phylum Protozoa				
Subphylum Plasmodroma				
Class Sarcodina				
Subclass Rhizopoda				
Order Testacida				
Family Euglyphidae				
<i>Euglypha</i> sp.	-	-	9,000	-
Subphylum Ciliophora				
Class Ciliata				
Subclass Spirotricha				
Order Tintinnida				
Family Tintinnididae				
<i>Leprotintinnus nordquisti</i>	43,000	-	-	8,000
Family Codonellidae				
<i>Tintinnopsis beroidea</i>	128,000	-	-	251,000
<i>Tintinnopsis campanula</i>	17,000	26,000	-	-
<i>Tintinnopsis dadayi</i>	17,000	-	-	8,000
<i>Tintinnopsis lacustris</i>	9,000	-	-	-
<i>Tintinnopsis meunieri</i>	-	9,000	317,000	17,000
<i>Tintinnopsis tocaninensis</i>	26,000	-	-	8,000
<i>Tintinnopsis tubulosa</i>	-	-	9,000	-

ตาราง ผลการวิเคราะห์แพลงก์ตอนพืชและแพลงก์ตอนสัตว์ (เก็บตัวอย่างวันที่ 3 ธันวาคม 2568)
(ต่อ)

ชนิดของแพลงก์ตอน	ปริมาณแพลงก์ตอน (หน่วยต่อลูกบาศก์เมตร)			
	S1	S2	S3	S4
Family Codonellopsidae				
<i>Codonellopsis ostenfeldi</i>	17,000	-	35,000	8,000
<i>Stenosemella nivalis</i>	17,000	9,000	-	8,000
Family Petalotrichidae				
<i>Metacylis pithos</i>	-	-	-	8,000
Family Cyttarocylidae				
<i>Favella panamensis</i>	17,000	9,000	-	17,000
Family Rhabdonellidae				
<i>Rhabdonella poculum</i>	-	-	-	8,000
Family Tintinnidae				
<i>Eutintinnus fraknoi</i>	9,000	17,000	-	25,000
<i>Eutintinnus perminutus</i>	9,000	-	-	-
Subclass Peritricha				
Order Peritrichida				
<i>Vorticella</i> sp.	26,000	-	44,000	-
Phylum Rotifera				
Class Monogononta				
Order Ploima				
Family Brachionidae				
<i>Brachionus</i> sp.	-	9,000	-	-
Family Lecanidae				
<i>Lecane inopinata</i>	-	-	9,000	-
Family Tricercidae				
<i>Trichocerca</i> sp.	-	-	18,000	-
Family Synchaetidae				
<i>Synchaeta</i> sp.	9,000	-	-	8,000

ตาราง ผลการวิเคราะห์แพลงก์ตอนพืชและแพลงก์ตอนสัตว์ (เก็บตัวอย่างวันที่ 3 ธันวาคม 2568)
(ต่อ)

ชนิดของแพลงก์ตอน	ปริมาณแพลงก์ตอน (หน่วยต่อลูกบาศก์เมตร)			
	S1	S2	S3	S4
Phylum Annelida				
Class Polychaeta				
Polychaete larvae	9,000	-	-	-
Phylum Arthropoda				
Class Crustacea				
Subclass Copepoda				
Copepod nauplius	26,000	145,000	273,000	50,000
Order Calanoida				
Calanoid copepod	-	9,000	-	-
Order Cyclopoida				
Cyclopoid copepod	9,000	-	-	-
Order Harpacticoida				
Harpacticoid copepod	9,000	9,000	-	-
Phylum Mollusca				
Class Gastropoda				
Gastropod larvae	9,000	-	-	-
Class Bivalvia				
Pelecypod larvae	26,000	-	-	33,000
Phylum Chordata				
Subphylum Urochordata				
Class Larvacea				
Order Urochorda				
Family Oikopleuridae				
<i>Oikopleura</i> sp.	17,000	26,000	-	8,000

ตาราง ผลการวิเคราะห์เพลงก่ตอนพืชและเพลงก่ตอนสัตว์ (เก็บตัวอย่างวันที่ 3 ธันวาคม 2568)
(ต่อ)

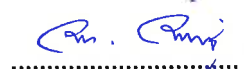
ชนิดของเพลงก่ตอน	ปริมาณเพลงก่ตอน (หน่วยต่อลูกบาศก์เมตร)			
	S1	S2	S3	S4
ชนิดของเพลงก่ตอนพืช	82	82	59	83
ชนิดของเพลงก่ตอนสัตว์	20	10	8	15
ชนิดเพลงก่ตอนรวม	102	92	67	98
ปริมาณเพลงก่ตอนพืช	84,068,000	44,629,000	86,422,000	57,436,000
ปริมาณเพลงก่ตอนสัตว์	449,000	268,000	714,000	465,000
ปริมาณเพลงก่ตอนรวม	84,517,000	44,897,000	87,136,000	57,901,000
ค่าดัชนีความหลากหลายเพลงก่ตอนพืช	2.5203	2.8742	1.6069	3.0330
ค่าดัชนีความหลากหลายเพลงก่ตอนสัตว์	2.6130	1.6437	1.3058	1.7885
ค่าดัชนีความสม่ำเสมอเพลงก่ตอนพืช	0.5719	0.6522	0.3941	0.6864
ค่าดัชนีความสม่ำเสมอเพลงก่ตอนสัตว์	0.8772	0.7138	0.6280	0.6604

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



(นางสาวกนกวรรณ ขาวค่อน)

ผู้วิเคราะห์



(นายอลงกต อินทราชา)

หัวหน้าสถานีวิจัยประมงศรีราชา



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

รายงานผลการวิเคราะห์สัตว์หน้าดิน

ตาราง ผลการวิเคราะห์สัตว์หน้าดิน (เก็บตัวอย่างวันที่ 3 ธันวาคม 2568)

สกุลสัตว์หน้าดิน	ปริมาณสัตว์หน้าดิน (ตัวต่อตารางเมตร)			
	S1	S2	S3	S4
Phylum Annelida				
Class Polychaeta				
Order Capitellida				
Family Capitellidae				
<i>Heteromastus</i> sp. (ไส้เดือนทะเล)	45	149	-	-
Order Opheliida				
Family Opheliidae				
<i>Armandia</i> sp. (ไส้เดือนทะเล)	-	30	-	45
Order Orbiniida				
Family Orbiniidae				
<i>Scoloplos</i> sp. (ไส้เดือนทะเล)	-	30	-	-
Order Phyllodocida				
Family Nephtyidae				
<i>Nephtys</i> sp. (ไส้เดือนทะเล)	30	-	-	30
Phylum Arthropoda				
Class Malacostraca				
Order Decapoda				
Family Diogenidae				
<i>Diogenes</i> sp. (ปูเสฉวน)	-	-	-	312

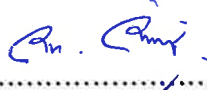
ตาราง ผลการวิเคราะห์สัตว์หน้าดิน (เก็บตัวอย่างวันที่ 3 ธันวาคม 2568)

(ต่อ)

สกุลสัตว์หน้าดิน	ปริมาณสัตว์หน้าดิน (ตัวต่อตารางเมตร)			
	S1	S2	S3	S4
Phylum Mollusca Class Gastropoda Order Caenogastropoda Family Potamididae <i>Cerithidea</i> sp. (หอยจู้บแจ่ง)	-	-	-	75
Class Bivalvia Order Cardiida Family Tellinidae <i>Tellina</i> sp. (หอยสองฝาชนิดหนึ่ง)	15	45	30	-
Phylum Echinodermata Class Ophiuroidea Order Ophiurida Family Ophiotrichidae <i>Ophiothrix</i> sp. (ดาวเปราะ)	15	-	-	-
Phylum Chordata Class Leptocardii Order Amphioxiformes Family Branchiostomidae <i>Branchiostoma</i> sp. (แอมฟิออกซัส)	30	-	15	60
สกุลสัตว์หน้าดิน	5	4	2	5
ปริมาณสัตว์หน้าดิน	135	254	45	522
ค่าดัชนีความหลากหลายสัตว์หน้าดิน	1.5230	1.1241	0.6365	1.2105

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


.....
(นายอรรถวุฒิ กันทะวงศ์)
ผู้วิเคราะห์


.....
(นายอลงกต อินทรชาติ)
หัวหน้าสถานีวิจัยประมงศรีราชา

ใบรับรองผลการตรวจวัดคุณภาพน้ำใต้ดิน



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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	: 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 ^{1/}
				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 23rd 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.	: 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.Nattibachai Chaiyakhot
SAMPLE CONDITION	: Normal	FILE CODE	: 225003_GW_March

PARAMETER	UNIT	ANALYSIS METHODS	ND (non-detectable)	STATION		STANDARD ^{1/}
				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 23RD ED. 2017 (AWWA, APHA, WEF)

Jutarat Jaemruen

(Miss Jutarat Jaemruen)

Analyst

REG. NO. ๖-239-๖-0022

(Mrs. Araya Tipparuk)

Technical Management Team

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SAMPLING DATE	: 27/03/2025	SAMPLING TIME	: 10:35-10:51,14:17-14:33
RECEIVED DATE	: 28/03/2025	ANALYTICAL DATE	: 31/03/2025-01/04/2025
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 ¹⁾
				MW-101B	MW-102A	
<u>Total Petroleum Hydrocarbon</u>						
- TPH (C ₅ - C ₈)	mg/l	5030 C/8260 D	< 0.003	ND	ND	≤ 1.4
- Pentane						
- Benzene						
- Toluene						
- m,p-Xylene						
- o-Xylene						
- Ethylbenzene						
- TPH (C ₉ - C ₁₆)	mg/l	3510 C/8015 D	< 0.025	ND	ND	≤ 1.7
- n-Nonane						
- n-Decane						
- n-Dodecane						
- n-Tetradecane						
- n-Hexadecane						
- TPH (C ₁₆ - C ₃₅)	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 23rd ED. 2017 (AWWA/APHA/WEF)

Sudaporn S.
(Miss Sudaporn Soonthorn)

Analyst

REG. NO. ๖-239-๓-0001

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	: 0574/68
SAMPLING BY	: SECOT Co., Ltd.	SAMPLING METHOD	: Pneumatic Bladder Pump
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
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 ^{1/}
				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, 23RD ED. 2017 (AWWA, APHA, WEF)

Jutarat Jaemruen

(Miss Jutarat Jaemruen)

Analyst

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(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. :	0574/68
SAMPLING BY	: SECOT Co., Ltd.	SAMPLING METHOD	: Pneumatic Bladder Pump
SAMPLING DATE	: 26/03/2025	SAMPLING TIME	: 15:14-15:31, 14:41-14:55
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 ^{1/}
				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 23RD ED. 2017 (AWWA, APHA, WEF)

Jutarat Jaemruen

(Miss Jutarat Jaemruen)

Analyst

REG. NO. ๖-239-๖-0022

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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 ^{1/}
				MW-103A	MW-104A	
<u>Total Petroleum Hydrocarbon</u>						
- TPH (C ₅ - C ₈)	mg/l	5030 C/8260 D	< 0.003	ND	ND	≤ 1.4
- Pentane						
- Benzene						
- Toluene						
- m,p-Xylene						
- o-Xylene						
- Ethylbenzene						
- TPH (C _{>8} - C ₁₆)	mg/l	3510 C/8015 D	< 0.025	ND	ND	≤ 1.7
- n-Nonane						
- n-Decane						
- n-Dodecane						
- n-Tetradecane						
- n-Hexadecane						
- TPH (C _{>16} - C ₃₅)	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 21ST ED 2017 (AWWA, APHA, WEF)

Sudaporn S.
(Miss Sudaporn Soonthorn)

Analyst

REG. NO. 3-239-0-0001

(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	: 0574/68
SAMPLING BY	: SECOT Co., Ltd.	SAMPLING METHOD	: Pneumatic Bladder Pump
SAMPLING DATE	: 26/03/2025	SAMPLING TIME	: 09:28-09:41, 09:59-10:12
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 ^{1/}
				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 23rd ED. 2017 (AWWA, APHA, WEF)

Jutarat Jaemruen

(Miss Jutarat Jaemruen)

Analyst

REG. NO. 2-239-ก-0022

Araya Tipparuk

(Mrs. Araya Tipparuk)

Technical Management Team

REG. NO. 2-239-ก-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	: 09:28-09:41, 09:59-10:12
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 ^{1/}
				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 23rd ED. 2017 (AWWA APHA WEF)

Jutarat Jaemruen
(Miss Jutarat Jaemruen)

Analyst

REG. NO. ๖-239-๖-0022

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	: 0574/68
SAMPLING BY	: SECOT Co., Ltd.	SAMPLING METHOD	: Pneumatic Bladder Pump
SAMPLING DATE	: 26/03/2025	SAMPLING TIME	: 09:28-09:41, 09:59-10:12
RECEIVED DATE	: 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 ^{1/}
		METHODS	(non-detectable)	MW-105B	MW-106B	
<u>Total Petroleum Hydrocarbon</u>						
- TPH (C ₅ - C ₈)	mg/l	5030 C/8260 D	< 0.003	ND	ND	≤ 1.4
- Pentane						
- Benzene						
- Toluene						
- m,p-Xylene						
- o-Xylene						
- Ethylbenzene						
- TPH (C ₉ - C ₁₆)	mg/l	3510 C/8015 D	< 0.025	ND	ND	≤ 1.7
- n-Nonane						
- n-Decane						
- n-Dodecane						
- n-Tetradecane						
- n-Hexadecane						
- TPH (C ₁₆ - C ₃₅)	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 21st ED. 2017 (AWWA, APHA, WEF)

Sudaporn S.
(Miss Sudaporn Soonthorn)

Analyst

REG. NO. 2-239-0-0001

(Mrs. Araya Tipparuk)

Technical Management Team

REG. NO. 2-239-0-0004

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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	: 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 ^{1/}
				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 21st ED, 2017 (AWWA, APHA, WEF)

Jutarat Jaemruen

(Miss Jutarat Jaemruen)

Analyst

REG. NO. ๖-239-๓-0022

(Signature)

(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
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 ^{1/}
				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 21st ED. 2017 (AWWA, APHA, WEF)

Jutarat Jaemrueen
(Miss Jutarat Jaemrueen)

Analyst

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Araya Tipparuk
(Mrs. 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	: 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 ^{1/}
				MW-107C	MW-108B	
<u>Total Petroleum Hydrocarbon</u>						
- TPH (C ₅ - C ₈)	mg/l	5030 C/8260 D	< 0.003	ND	ND	≤ 1.4
- Pentane						
- Benzene						
- Toluene						
- m,p-Xylene						
- o-Xylene						
- Ethylbenzene						
- TPH (C _{>8} - C ₁₆)	mg/l	3510 C/8015 D	< 0.025	ND	ND	≤ 1.7
- n-Nonane						
- n-Decane						
- n-Dodecane						
- n-Tetradecane						
- n-Hexadecane						
- TPH (C _{>16} - C ₃₅)	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 23rd 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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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 Chaiyakhot
SAMPLE CONDITION	: Normal	FILE CODE	: 225003_GW_March

PARAMETER	UNIT	ANALYSIS METHODS	ND (non-detectable)	STATION		STANDARD ¹⁾
				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 21st 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

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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 Chaiyakhot
SAMPLE CONDITION	: Normal	FILE CODE	: 225003_GW_March

PARAMETER	UNIT	ANALYSIS METHODS	ND (non-detectable)	STATION		STANDARD ^{1/}
				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 21st ED. 2017 (AWWA, APHA, WEF)

Jutarat Jaemruen
(Miss Jutarat Jaemruen)

Analyst

REG. NO. ๖-239-๖-0022

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	: 31/03/2025-01/04/2025
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 ^{1/}
				MW-109A	MW-111A	
<u>Total Petroleum Hydrocarbon</u>						
- TPH (C ₅ - C ₈)	mg/l	5030 C/8260 D	< 0.003	ND	ND	≤ 1,4
- Pentane						
- Benzene						
- Toluene						
- m,p-Xylene						
- o-Xylene						
- Ethylbenzene						
- TPH (C ₉ - C ₁₆)	mg/l	3510 C/8015 D	< 0.025	ND	ND	≤ 1.7
- n-Nonane						
- n-Decane						
- n-Dodecane						
- n-Tetradecane						
- n-Hexadecane						
- TPH (C ₁₆ - C ₃₅)	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						
- Dotriacontane						
- n-Tetratriacontane						
- Pentatriacontane						

REFERENCE : STANDARD METHODS FOR EXAMINATION OF WATER AND WASTEWATER 21st 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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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 Chaiyakhhot
SAMPLE CONDITION	: Normal	FILE CODE	: 225003_GW_March

PARAMETER	UNIT	ANALYSIS METHODS	ND (non-detectable)	STATION		STANDARD ^{1/}
				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 23rd ED. 2017 (AWWA APHA, WEF)

Jutarat Jaemruen

(Miss Jutarat Jaemruen)

Analyst

REG. NO. ๖-239-๖-0022

Araya Tipparuk

(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	: 31/03/2025
REPORT DATE	: 05/04/2025	SITE OPERATOR	: Mr.Nattachai Chaiyakhot
SAMPLE CONDITION	: Normal	FILE CODE	: 225003_GW_March

PARAMETER	UNIT	ANALYSIS METHODS	ND (non-detectable)	STATION		STANDARD ¹⁾
				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 23rd ED. 2017 (ASWWA, APHA, WEF)

Jutarat Jaemruen
(Miss Jutarat Jaemruen)

Analyst

REG. NO. ๓-239-๓-0022

(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	: 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 METHODS	ND (non-detectable)	STATION		STANDARD ¹⁾
				MW-112A	MW-113A	
<u>Total Petroleum Hydrocarbon</u>						
- TPH (C ₅ - C ₈)	mg/l	5030 C/8260 D	< 0.003	ND	ND	≤ 1.4
- Pentane						
- Benzene						
- Toluene						
- m,p-Xylene						
- o-Xylene						
- Ethylbenzene						
- TPH (C ₉ - C ₁₆)	mg/l	3510 C/8015 D	< 0.025	ND	ND	≤ 1.7
- n-Nonane						
- n-Decane						
- n-Dodecane						
- n-Tetradecane						
- n-Hexadecane						
- TPH (C ₁₆ - C ₃₅)	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 23rd 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	: 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 Chaiyakhrot
SAMPLE CONDITION	: Normal	FILE CODE	: 225003_GW_March

PARAMETER	UNIT	ANALYSIS METHODS	ND (non-detectable)	STATION		STANDARD ^{1/}
				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 23rd ED. 2017 (AWWA, APHA, WEF)

Jutarat Jaemruen
(Miss Jutarat Jaemruen)

Analyst

REG. NO. ๖-239-๓-0022

(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. :	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 Chaiyakhot
SAMPLE CONDITION	: Normal	FILE CODE	: 225003_GW_March

PARAMETER	UNIT	ANALYSIS METHODS	ND (non-detectable)	STATION		STANDARD ^{1/}
				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 23rd ED. 2017 (AWWA APHA WEF)

Jutarat Jaemruen
(Miss Jutarat Jaemruen)

Analyst

REG. NO. ๖-239-๖-0022

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(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	: 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 Chaiyakhot
SAMPLE CONDITION	: Normal	FILE CODE	: 225003_GW_March

PARAMETER	UNIT	ANALYSIS METHODS	ND (non-detectable)	STATION		STANDARD ^{1/}
				MW-114A	MW-115A	
<u>Total Petroleum Hydrocarbon</u>						
- TPH (C ₅ - C ₈)	mg/l	5030 C/8260 D	< 0.003	ND	ND	≤ 1.4
- Pentane						
- Benzene						
- Toluene						
- m,p-Xylene						
- o-Xylene						
- Ethylbenzene						
- TPH (C ₉ - C ₁₆)	mg/l	3510 C/8015 D	< 0.025	ND	ND	≤ 1.7
- n-Nonane						
- n-Decane						
- n-Dodecane						
- n-Tetradecane						
- n-Hexadecane						
- TPH (C ₁₆ - C ₃₅)	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 23rd ED. 2017 (AWWA, APHA, WEF)

Sudaporn S.
(Miss Sudaporn Soonthorn)

Analyst

REG. NO. 3-239-0-0001

(Mrs. Araya Tipparuk)

Technical Management Team

REG. NO. 3-239-0-0004

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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 ¹⁾
				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: USE EPA SW-846 TEST METHODS FOR EVALUATING WATER AND SOLID WASTE, 1st ED., 1990

Jutarat Jaemruen
(Miss Jutarat Jaemruen)

Analyst

REG. NO. 1-239-1-0022

Araya Tipparuk

(Mrs. Araya Tipparuk)

Technical Management Team

REG. NO. 1-239-1-0004

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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	: 27/03/2024-04/04/2024
REPORT DATE	: 17/04/2024	SITE OPERATOR	: Mr. Baworn Decchalya
SAMPLE CONDITION	: Normal	FILE CODE	: 224003_Soil_March

PARAMETER	UNIT	ANALYSIS METHODS	ND (non-detectable)	STATION		STANDARD ^{1/}
				MW-101 B	MW-102 A	
Total Petroleum Hydrocarbons						
- TPH (C ₅ - C ₉)	mg/kg	5035A /8260 D	< 0.003	ND	ND	≤ 25
- Pentane						
- Benzene						
- Toluene						
- m,p-Xylene						
- o-Xylene						
- Ethylbenzene						
- TPH (C ₁₀ - C ₁₆)	mg/kg	3540C/8015 D	< 0.25	1.23	ND	≤ 25
- n-Nonane						
- n-Decane						
- n-Dodecane						
- n-Tetradecane						
- n-Hexadecane						
- TPH (C ₁₇ - C ₃₃)	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: USE EPA SW-846 TEST METHODS FOR EVALUATING WATER AND SOIL WASTE, 1st ED., 2020.

Sudaporn S.

(Miss Sudaporn Soonthorn)

Analyst

REG. NO. 2-239-ก-0001

NR

(Mrs. Araya Tipparuk)

Technical Management Team

REG. NO. 2-239-ก-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 ^{1/}
				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, 1st ED., 2010

Jutarat Jaemruen

(Miss Jutarat Jaemruen)

Analyst

REG. NO. 3-239-0-0022

Araya Tipparuk

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Technical Management Team

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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	: 27/03/2024-04/04/2024
REPORT DATE	: 17/04/2024	SITE OPERATOR	: Mr. Baworn Deechaiya
SAMPLE CONDITION	: Normal	FILE CODE	: 224003 Soil March

PARAMETER	UNIT	ANALYSIS	ND	STATION		STANDARD ¹⁾
		METHODS	(non-detectable)	MW-103 A	MW-104 A	
<u>Total Petroleum Hydrocarbons</u>						
- TPH (C ₅ - C ₈)	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 ₉ - C ₁₆)	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 ₁₆ - C ₃₂)	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: USE EPA SW-846 TEST METHODS FOR EVALUATING WATER AND SOLID WASTE, 1ST ED. 2008

Sudaporn S.
(Miss Sudaporn Soonthorn)
Analyst
REG. NO. 7-239-ก-0001

(Mrs. Araya Tippanik)
Technical Management Team
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SOIL SAMPLES ANALYSIS REPORT

CLIENT NAME	: Star Petroleum Refining Public Co., Ltd.	REQUEST SERVICE No.	: 0583/67
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 ¹⁾
				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 3rd ED. 2002

Jutarat Jaenruen

(Miss Jutarat Jaenruen)

Analyst

REG. NO. 2-239-ก-0022

Araya Tipparuk

(Mrs. Araya Tipparuk)

Technical Management Team

REG. NO. 2-239-ก-0004

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 3. ¹⁾ 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	: 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 (non-detectable)	STATION		STANDARD ¹⁾
		METHODS		MW-105 B	MW-106 B	
<u>Total Petroleum Hydrocarbons</u>						
- TPH (C ₅ - C ₆)	mg/kg	5035A /8260 D	< 0.003	ND	ND	≤ 25
- Pentane						
- Benzene						
- Toluene						
- m,p-Xylene						
- o-Xylene						
- Ethylbenzene						
- TPH (C ₇₋₈ - C ₁₆)	mg/kg	3540C/8015 D	< 0.25	ND	ND	≤ 25
- n-Nonane						
- n-Decane						
- n-Dodecane						
- n-Tetradecane						
- n-Hexadecane						
- TPH (C ₁₆ - C ₃₅)	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, 7th ED., 2020

Sudaporn S.

(Miss Sudaporn Soonthorn)

Analyst

REG. NO. 2-239-จ-0001

NR

(Mrs. Araya Tipparuk)

Technical Management Team

REG. NO. 2-239-ก-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 ^{1/}
				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, 1st ED. 1990

Jutarat Jaemruen

(Miss Jutarat Jaemruen)

Analyst

REG. NO. 2-239-ก-0022

Araya Tipparuk

(Mrs. Araya Tipparuk)

Technical Management Team

REG. NO. 2-239-ก-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	: 25-26/03/2024	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 METHODS	ND (non-detectable)	STATION		STANDARD ^{1/}
				MW-108 B	MW-109 A	
Total Petroleum Hydrocarbons						
- TPH (C ₅ - C ₉)	mg/kg	5035A /8260 D	< 0.003	ND	ND	≤ 25
- Pentane						
- Benzene						
- Toluene						
- m,p-Xylene						
- o-Xylene						
- Ethylbenzene						
- TPH (C ₁₀ - C ₁₆)	mg/kg	3540C/8015 D	< 0.25	ND	ND	≤ 25
- n-Nonane						
- n-Decane						
- n-Dodecane						
- n-Tetradecane						
- n-Hexadecane						
- TPH (C ₁₈ - C ₃₃)	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, 1st ED., 2020

Sudaporn S.

(Miss Sudaporn Soonthorn)

Analyst

REG. NO. 7-239-0-0001

NTL

(Mrs. Araya Tipparuk)

Technical Management Team

REG. NO. 7-239-ก-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	: 25/03/2024	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 ^{1/}
				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 : U.S. EPA SW 846 TEST METHODS FOR EVALUATING WATER AND SOLID WASTE, 3rd ED., 2020

Jutarat Jaenruen
(Miss Jutarat Jaenruen)

Analyst

REG. NO. 1-239-0-0022

(Mrs. Araya Tipparak)

Technical Management Team

REG. NO. 1-239-0-0004

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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	: 25/03/2024	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 Dechchaiya
SAMPLE CONDITION	: Normal	FILE CODE	: 224003 Soil March

PARAMETER	UNIT	ANALYSIS METHODS	ND (non-detectable)	STATION		STANDARD ^{1/}
				MW-112 A	MW-113 A	
Total Petroleum Hydrocarbons						
- TPH (C ₅ - C ₁₆)	mg/kg	5035A /8260 D	< 0.003	ND	ND	≤ 25
- Pentane						
- Benzene						
- Toluene						
- m,p-Xylene						
- o-Xylene						
- Ethylbenzene						
- TPH (C ₉ - C ₁₆)	mg/kg	3540C/8015 D	< 0.25	ND	ND	≤ 25
- n-Nonane						
- n-Decane						
- n-Dodecane						
- n-Tetradecane						
- n-Hexadecane						
- TPH (C ₁₆ - C ₂₅)	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-Tetracontane						
- Pentacontane						

REFERENCE : US EPA SW-846 TEST METHODS FOR EVALUATING WATER AND SOLID WASTE, 1st ED., 2016

Sudaporn S.

(Miss Sudaporn Soonthorn)

Analyst

REG. NO. 2-239-ก-0001

Araya T.

(Mrs. Araya Tippuruk)

Technical Management Team

REG. NO. 2-239-ก-0004

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Noise Monitoring Result : Working Noise

MTR-SPRC PLC-Refinery

Location : CDU (Near 02GM102A)

Monitor Period : Aug 14, 2025

SLM Model : SCARLET ST-21D

Serial No : 821080

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-515-2025-191

Time	Equivalent Sound Pressure Level (dB(A))	
	Aug 14, 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	86.4	
08:00 - 09:00	86.5	
09:00 - 10:00	86.7	
10:00 - 11:00	86.9	
11:00 - 12:00	86.8	
12:00 - 13:00	86.7	
13:00 - 14:00	86.5	
14:00 - 15:00	86.4	
15:00 - 16:00		
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)*	86.6	
Lmax **	94.3	
Standard-8Hr	90 dB(A)	
Standard-Max	140 dB(A)	

Remark : * Average time between 07:00-15:00

** Maximum Sound Pressure Level between 07:00-15:00

(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 : Nov 06, 2025

SLM Model : SCARLET ST-21D

Serial No : 820725

Site Operator : Miss Wiraya Patchimboon

Calibrator Model : Cirrus CR:515

Serial No : 94296

Calibration Ref dB(A) : 94.0

Certified Date : Feb 27 2025

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

Expire Date : Feb 25 2026

Cal Sheet No.: CR-515-2025-288

Time	Equivalent Sound Pressure Level (dB(A))	
	Nov 06, 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	82.5	
09:00 - 10:00	82.4	
10:00 - 11:00	82.5	
11:00 - 12:00	82.4	
12:00 - 13:00	82.5	
13:00 - 14:00	82.5	
14:00 - 15:00	82.5	
15:00 - 16:00	82.6	
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)*	82.5	
Lmax **	97.4	
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 : Aug 14, 2025

SLM Model : SCARLET ST-21D

Serial No : 820724

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-515-2025-191

Time	Equivalent Sound Pressure Level (dB(A))	
	Aug 14, 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	85.8	
09:00 - 10:00	85.3	
10:00 - 11:00	86.2	
11:00 - 12:00	84.9	
12:00 - 13:00	85.2	
13:00 - 14:00	84.9	
14:00 - 15:00	84.7	
15:00 - 16:00	84.9	
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)*	85.3	
Lmax **	97.6	
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 : Nov 06, 2025

SLM Model : SCARLET ST-21D

Serial No : 820730

Site Operator : Miss Wiraya Patchimboon

Calibrator Model : Cirrus CR:515

Serial No : 94296

Calibration Ref dB(A) : 94.0

Certified Date : Feb 27 2025

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

Expire Date : Feb 25 2026

Cal Sheet No.: CR-515-2025-288

Time	Equivalent Sound Pressure Level (dB(A))	
	Nov 06, 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	86.2	
09:00 - 10:00	85.9	
10:00 - 11:00	85.9	
11:00 - 12:00	86.0	
12:00 - 13:00	85.8	
13:00 - 14:00	85.6	
14:00 - 15:00	85.7	
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)*	85.8	
Lmax **	94.3	
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 : Utility (During 41G103A-B)

Monitor Period : Aug 14, 2025

SLM Model : SCARLET ST-21D

Serial No : 821079

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-515-2025-191

Time	Equivalent Sound Pressure Level (dB(A))
	Aug 14, 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	88.0
08:00 - 09:00	88.1
09:00 - 10:00	88.1
10:00 - 11:00	88.2
11:00 - 12:00	88.1
12:00 - 13:00	88.2
13:00 - 14:00	88.1
14:00 - 15:00	88.1
15:00 - 16:00	
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)*	88.1
Lmax **	99.7
Standard-8Hr	90 dB(A)
Standard-Max	140 dB(A)

Remark : * Average time between 07:00-15:00

** Maximum Sound Pressure Level between 07:00-15:00

(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 : Nov 06, 2025

SLM Model : SCARLET ST-21D

Serial No : 821080

Site Operator : Miss Wiraya Patchimboon

Calibrator Model : Cirrus CR:515

Serial No : 94296

Calibration Ref dB(A) : 94.0

Certified Date : Feb 27 2025

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

Expire Date : Feb 25 2026

Cal Sheet No.: CR-515-2025-288

Time	Equivalent Sound Pressure Level (dB(A))
	Nov 06, 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	88.9
08:00 - 09:00	88.9
09:00 - 10:00	88.9
10:00 - 11:00	89.0
11:00 - 12:00	89.0
12:00 - 13:00	88.8
13:00 - 14:00	88.7
14:00 - 15:00	88.6
15:00 - 16:00	
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)*	88.9
Lmax **	90.4
Standard-8Hr	90 dB(A)
Standard-Max	140 dB(A)

Remark : * Average time between 07:00-15:00

** Maximum Sound Pressure Level between 07:00-15:00

(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 : Aug 14, 2025

SLM Model : SCARLET ST-21D

Serial No : 820730

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-515-2025-191

Time	Equivalent Sound Pressure Level (dB(A))	
	Aug 14, 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	87.5	
10:00 - 11:00	87.5	
11:00 - 12:00	87.9	
12:00 - 13:00	87.5	
13:00 - 14:00	87.0	
14:00 - 15:00	87.0	
15:00 - 16:00	87.4	
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 **	89.8	
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 : Nov 06, 2025

SLM Model : SCARLET ST-21D

Serial No : 820724

Site Operator : Miss Wiraya Patchimboon

Calibrator Model : Cirrus CR:515

Serial No : 94296

Calibration Ref dB(A) : 94.0

Certified Date : Feb 27 2025

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


Expire Date : Feb 25 2026

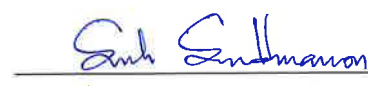
Cal Sheet No.: CR-515-2025-288

Time	Equivalent Sound Pressure Level (dB(A))	
	Nov 06, 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	88.0	
08:00 - 09:00	87.3	
09:00 - 10:00	86.8	
10:00 - 11:00	87.0	
11:00 - 12:00	86.9	
12:00 - 13:00	86.7	
13:00 - 14:00	87.2	
14:00 - 15:00	86.8	
15:00 - 16:00		
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 **	99.7	
Standard-8Hr	90 dB(A)	
Standard-Max	140 dB(A)	

Remark : * Average time between 07:00-15:00

** Maximum Sound Pressure Level between 07:00-15:00


 (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-2509-0166
MEASUREMENT BY	: SECOT Co., Ltd.	MEASUREMENT DATE	: 11/09/2025
OPERATOR	: Miss Wiraya Patchimboon	INSTRUMENT	: Dosimeter
INSTRUMENT MODEL	: Cirrus CR110A	INSTRUMENT SERIAL NO.	: CB1042
CALIBRATOR MODEL	: CIRRUS RC 110A	CALIBRATOR SERIAL NO.	: 95167
CALIBRATION REF.	: 1,000 Hz, 114 dB	CALIBRATION DATE	: 21/02/2025
READING / ADJUST	: 113.6 / 0.4	EXPIRE DATE	: 20/02/2026
CAL SHEET NO.	: NC-CIRRUS-2025-151		

OPERATOR NAME/ID	LOCATION	TIME	%DOSE	SOUND PRESSURE LEVEL (dBA)	
				TWA (12-hr)	STANDARD*
Operator ID#110917	Area 1 (CDU/VDU)	07.17-19.00	109.1	83.6	83.0


(Miss Katesarin Vorradetwittaya)

Environmental Scientist


(Miss Sununta Sirawuttinanon)

Technical Management Team

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NOISE MEASUREMENT REPORT : NOISE DOSE

CLIENT NAME	: Star Petroleum Refining Public Co., Ltd.	REFERENCE NO.	: 225005-Noise Dose-2511-0132
MEASUREMENT BY	: SECOT Co., Ltd.	MEASUREMENT DATE	: 06/11/2025
OPERATOR	: Miss Wiraya Patchimboon	INSTRUMENT	: Dosimeter
INSTRUMENT MODEL	: Cirrus CR110A	INSTRUMENT SERIAL NO.	: CB1025
CALIBRATOR MODEL	: CIRRUS RC 110A	CALIBRATOR SERIAL NO.	: 95167
CALIBRATION REF.	: 1,000 Hz, 114 dB	CALIBRATION DATE	: 21/02/2025
READING / ADJUST	: 113.8 / 0.2	EXPIRE DATE	: 20/02/2026
CAL SHEET NO.	: NC-CIRRUS-2025-212		

OPERATOR NAME/ID	LOCATION	TIME	%DOSE	SOUND PRESSURE LEVEL (dBA)	
				TWA (12-hr)	STANDARD*
Operator ID#110789	Area 1 (CDU/VDU)	07.25-19.00	92.3	82.9	83.0

(Miss Katesarin Vorradetwittaya)

Environmental Scientist

(Miss Sununta Sirawuttinanon)

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NOISE MEASUREMENT REPORT : NOISE DOSE

CLIENT NAME	: Star Petroleum Refining Public Co., Ltd.	REFERENCE NO.	: 225005-Noise Dose-2508-0091
MEASUREMENT BY	: SECOT Co., Ltd.	MEASUREMENT DATE	: 14/08/2025
OPERATOR	: Miss Wiraya Patchimboon	INSTRUMENT	: Dosimeter
INSTRUMENT MODEL	: Cirrus CR110A	INSTRUMENT SERIAL NO.	: CB1103
CALIBRATOR MODEL	: CIRRUS RC 110A	CALIBRATOR SERIAL NO.	: 95167
CALIBRATION REF.	: 1,000 Hz, 114 dB	CALIBRATION DATE	: 21/02/2025
READING / ADJUST	: 113.8 / 0.2	EXPIRE DATE	: 20/02/2026
CAL SHEET NO.	: NC-CIRRUS-2025-117		

OPERATOR ID	LOCATION	TIME	%DOSE	SOUND PRESSURE LEVEL (dBA)	
				TWA (12-hr)	STANDARD*
110916	Area 2	07.21-19.00	54.7	80.7	83.0
(NHTU, DHTU, WCN, BSU)					

(Miss Katesarin Vorradetwittaya)

Environmental Scientist

(Miss Sununta Sirawuttinanon)

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NOISE MEASUREMENT REPORT : NOISE DOSE

CLIENT NAME	: Star Petroleum Refining Public Co., Ltd.	REFERENCE NO.	: 225005-Noise Dose-2511-0132
MEASUREMENT BY	: SECOT Co., Ltd.	MEASUREMENT DATE	: 06/11/2025
OPERATOR	: Miss Wiraya Patchimboon	INSTRUMENT	: Dosimeter
INSTRUMENT MODEL	: Pulsar 22	INSTRUMENT SERIAL NO.	: PB632
CALIBRATOR MODEL	: Pulsar 22R	CALIBRATOR SERIAL NO.	: 79781
CALIBRATION REF.	: 1,000 Hz, 114 dB	CALIBRATION DATE	: 01/04/2025
READING / ADJUST	: 114.1 / -0.1	EXPIRE DATE	: 31/03/2026
CAL SHEET NO.	: NC-PULSAR-2025-121		

OPERATOR NAME/ID	LOCATION	TIME	%DOSE	SOUND PRESSURE LEVEL (dBA)	
				TWA (12-hr)	STANDARD*
Operator ID#110915	Area 2	07.22-19.00	37.9	79.0	83.0
(NHTU, DHTU, WCN, BSU)					

(Miss Katesarin Vorradetwittaya)

Environmental Scientist

(Miss Sununta Sirawuttinanon)

Technical Management Team

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NOISE MEASUREMENT REPORT : NOISE DOSE

CLIENT NAME	: Star Petroleum Refining Public Co., Ltd.	REFERENCE NO.	: 225005-Noise Dose-2508-0091
MEASUREMENT BY	: SECOT Co., Ltd.	MEASUREMENT DATE	: 14/08/2025
OPERATOR	: Miss Wiraya Patchimboon	INSTRUMENT	: Dosimeter
INSTRUMENT MODEL	: Cirrus CR110A	INSTRUMENT SERIAL NO.	: CB1056
CALIBRATOR MODEL	: CIRRUS RC 110A	CALIBRATOR SERIAL NO.	: 95167
CALIBRATION REF.	: 1,000 Hz, 114 dB	CALIBRATION DATE	: 21/02/2025
READING / ADJUST	: 113.5 / 0.5	EXPIRE DATE	: 20/02/2026
CAL SHEET NO.	: NC-CIRRUS-2025-117		

OPERATOR ID	LOCATION	TIME	%DOSE	SOUND PRESSURE LEVEL (dBA)	
				TWA (12-hr)	STANDARD*
110905	Area 3 (SRU, Utility)	07.21-19.00	54.6	80.7	83.0

(Miss Katesarin Vorradetwittaya)

Environmental Scientist

(Miss Sununta Sirawuttinanon)

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NOISE MEASUREMENT REPORT : NOISE DOSE

CLIENT NAME	: Star Petroleum Refining Public Co., Ltd.	REFERENCE NO.	: 225005-Noise Dose-2511-0132
MEASUREMENT BY	: SECOT Co., Ltd.	MEASUREMENT DATE	: 06/11/2025
OPERATOR	: Miss Wiraya Patchimboon	INSTRUMENT	: Dosimeter
INSTRUMENT MODEL	: Cirrus CR110A	INSTRUMENT SERIAL NO.	: CB1026
CALIBRATOR MODEL	: CIRRUS RC 110A	CALIBRATOR SERIAL NO.	: 95167
CALIBRATION REF.	: 1,000 Hz, 114 dB	CALIBRATION DATE	: 21/02/2025
READING / ADJUST	: 116.1 / -2.1	EXPIRE DATE	: 20/02/2026
CAL SHEET NO.	: NC-CIRRUS-2025-212		

OPERATOR NAME/ID	LOCATION	TIME	%DOSE	SOUND PRESSURE LEVEL (dBA)	
				TWA (12-hr)	STANDARD*
Operator ID#110905	Area 3 (SRU, Utility)	07.26-19.00	60.6	81.1	83.0

(Miss Katesarin Vorradetwittaya)

Environmental Scientist

(Miss Sununta Sirawuttinanon)

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NOISE MEASUREMENT REPORT : NOISE DOSE


CLIENT NAME	: Star Petroleum Refining Public Co., Ltd.	REFERENCE NO.	: 225005-Noise Dose-2509-0166
MEASUREMENT BY	: SECOT Co., Ltd.	MEASUREMENT DATE	: 11/09/2025
OPERATOR	: Miss Wiraya Patchimboon	INSTRUMENT	: Dosimeter
INSTRUMENT MODEL	: Cirrus CR110A	INSTRUMENT SERIAL NO.	: CB1041
CALIBRATOR MODEL	: CIRRUS RC 110A	CALIBRATOR SERIAL NO.	: 95167
CALIBRATION REF.	: 1,000 Hz, 114 dB	CALIBRATION DATE	: 21/02/2025
READING / ADJUST	: 113.6 / 0.4	EXPIRE DATE	: 20/02/2026
CAL SHEET NO.	: NC-CIRRUS-2025-151		

OPERATOR NAME/ID	LOCATION	TIME	%DOSE	SOUND PRESSURE LEVEL (dBA)	
				TWA (12-hr)	STANDARD*
Operator ID#110841	Area 4 (RFCCU)	07.19-19.00	210.4	86.5	83.0



(Miss Katesarin Vorradetwittaya)

Environmental Scientist



(Miss Sununta Sirawuttinanon)

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NOISE MEASUREMENT REPORT : NOISE DOSE

CLIENT NAME	: Star Petroleum Refining Public Co., Ltd.	REFERENCE NO.	: 225005-Noise Dose-2511-0132
MEASUREMENT BY	: SECOT Co., Ltd.	MEASUREMENT DATE	: 06/11/2025
OPERATOR	: Miss Wiraya Patchimboon	INSTRUMENT	: Dosimeter
INSTRUMENT MODEL	: Pulsar 22	INSTRUMENT SERIAL NO.	: PB617
CALIBRATOR MODEL	: Pulsar 22R	CALIBRATOR SERIAL NO.	: 79781
CALIBRATION REF.	: 1,000 Hz, 114 dB	CALIBRATION DATE	: 01/04/2025
READING / ADJUST	: 113.6 / 0.4	EXPIRE DATE	: 31/03/2026
CAL SHEET NO.	: NC-PULSAR-2025-121		

OPERATOR NAME/ID	LOCATION	TIME	%DOSE	SOUND PRESSURE LEVEL (dBA)	
				TWA (12-hr)	STANDARD*
Operator ID#110841	Area 4 (RFCCU)	07.20-19.00	40.8	79.4	83.0

(Miss Katesarin Vorradetwittaya)

Environmental Scientist

(Miss Sununta Sirawuttinanon)

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ภาคผนวก จ

ข้อมูลการตรวจเทียบเครื่องมือ
(Calibration Data Sheets)



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	Temperature (°C)				Time ⊙ min	DGM Correction factor (Y)	ΔH@ mm
	DGM	Volume V _m Liters	Ref DGM T _r	Dry Gas Meter					
	Volume V _r Liters			Inlet T _i	Outlet T _o	Avg T _m			
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 : 

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. M50-07

Metering System ID

DGM Number 90331

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	Temperature (°C)				Time	DGM	ΔH@ mm
	DGM	Volume	Ref DGM T _r	Dry Gas Meter			Θ min	Correction factor (Y)	
	Volume V _r , Liters	V _m Liters		Inlet T _i	Outlet T _o	Avg T _m			
12.5	100.1	101.0	25	25	24	24.5	8.67	0.9958	42.5842
25.0	99.9	100.8	25	25	24	24.5	6.23	0.9946	44.2513
50.0	100.0	100.9	25	25	24	24.5	4.62	0.9920	48.4414
76.0	100.1	99.3	25	25	24	24.5	3.63	1.0074	45.4868
100.0	100.2	100.7	25	25	24	24.5	3.63	0.9921	47.7831
150.0	99.9	99.4	25	25	24	24.5	2.62	0.9970	46.7598

Average 0.9965 45.8844

Approved by : 



CONTROL UNIT CALIBRATION

(Metric units, mm)

Date 8 Jan 25

Initial Final Average
Barometric press, Pb 759 759 759 mmHg

Dry Gas Meter Data

Console No. M50-08

Metering System ID

DGM Number 975906

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 H ₂ O	Ref. DGM Volume V _r Liters	DGM Volume V _m Liters	Temperature (°C)				Time Θ min	DGM Correction factor (Y)	ΔH@ mm
			Ref DGM T _r	Dry Gas Meter					
				Inlet T _i	Outlet T _o	Avg T _m			
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 : 

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 _r , Liters	DGM Volume V _m Liters	Temperature (°C)				Time Θ min	DGM Correction factor (Y)	ΔH@ mm
			Ref DGM T _r	Dry Gas Meter					
				Inlet T _i	Outlet T _o	Avg T _m			
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 : 



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.	ΔP_{std} (mm H ₂ O)	ΔP_s (mm H ₂ O)	Cp(s)	Deviation, δ 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_{P(A),avg} 0.8401

B Side Calibration

Run No.	ΔP_{std} (mm H ₂ O)	ΔP_s (mm H ₂ O)	Cp(s)	Deviation, δ 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_{P(B),avg} 0.8401

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

C_{P(Avg)} = 0.8401

Approved by :

*** δ must be ≤ 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. : PS20-01

Calibrated by : Mr. Montri P.

A Side Calibration

Run No.	ΔP_{std} (mm H ₂ O)	ΔP_s (mm H ₂ O)	Cp(s)	Deviation, δ 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_{P(A),avg} 0.8401

B Side Calibration

Run No.	ΔP_{std} (mm H ₂ O)	ΔP_s (mm H ₂ O)	Cp(s)	Deviation, δ 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_{P(B),avg} 0.8302

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

C_{P(Avg)} = 0.8351

Approved by :

*** δ must be ≤ 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.	ΔP_{std} (mm H ₂ O)	ΔP_s (mm H ₂ O)	Cp(s)	Deviation, δ 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_{P(A),avg} 0.8468

B Side Calibration

Run No.	ΔP_{std} (mm H ₂ O)	ΔP_s (mm H ₂ O)	Cp(s)	Deviation, δ 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_{P(B),avg} 0.8401

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

C_{P(Avg)} = 0.8435

Approved by :

*** δ must be ≤ 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. : PS25-02

Calibrated by : Mr. Montri P.

A Side Calibration

Run No.	ΔP_{std} (mm H ₂ O)	ΔP_s (mm H ₂ O)	Cp(s)	Deviation, δ Cp(s) - Cp(A)
1	15.0	20.5	0.8468	-0.0035
2	15.0	20.0	0.8574	0.0070
3	15.0	20.5	0.8468	-0.0035

C_{P(A),avg} 0.8504

B Side Calibration

Run No.	ΔP_{std} (mm H ₂ O)	ΔP_s (mm H ₂ O)	Cp(s)	Deviation, δ Cp(s) - Cp(B)
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_{P(B),avg} 0.8468

| CP(A)-CP(B) | = 0.0035

C_{P(Avg)} = 0.8486

Approved by :

*** δ must be ≤ 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.	ΔP_{std} (mm H ₂ O)	ΔP_s (mm H ₂ O)	Cp(s)	Deviation, δ 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

Cp(A)_{avg} 0.8435

B Side Calibration

Run No.	ΔP_{std} (mm H ₂ O)	ΔP_s (mm H ₂ O)	Cp(s)	Deviation, δ 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

Cp(B)_{avg} 0.8435

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

Cp(Avg) = 0.8435

Approved by :

*** δ must be ≤ 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) 9393600 Fax: (662) 9393535
 E-Mail: secoty@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 M³ (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 Result¹Uncertainty²Method of Analysis³

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:

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 Parinyasontorn

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 ลินด์ (ประเทศไทย) จำกัด (มหาชน)

เลขที่ใบแจ้งหนี้: 01072306048

ณ 15 มกราคม 2567 ณ 2/3 หมู่ 14 ตำบลบางทรายใหญ่ หมู่ 6.5 แขวงบาง

อ.บางพลี จ.สมุทรปราการ 10540 โทรศัพท์ (66) 2338-6100 โทรสาร (66) 2338-6333

เลขประจำใบแจ้งหนี้: 105 หมู่ 5 ซ.บางพลีใหญ่ อ.บางพลี จ.สมุทรปราการ 24180

โทรศัพท์ (66) 38.570-479-93

โทรสาร (66) 38.570-323

Linde (Thailand) Public Company Limited

TEL: Bangkok 02-23386100

15th 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

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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:	1096/24	Date of Issue:	26-Apr-2024	Expiry date:
Material Details				26-Apr-2027
Production Order:	90183676	Material Code:	511600-SK-34	Cylinder No.:
Gas content:	5,200 M ³	Filling pressure:	137 bar	143360
Cylinder Owner:	LINDE	Cylinder Material:	Spectra seal	Valve:
				CGA 660 SS
				Cylinder Size:
				40 L

Laboratory Report

Analytical Result				
Component	Normal Concentration	Analysis Result ¹	Uncertainty ²	Method of Analysis ³
Nitric Oxide	40.0 ppm	39.2 ppm	± 1% relative	(6) I-PB-352
Other NOx impurity		Less than 1.9 ppm		
Carbon Monoxide	40.0 ppm	40.9 ppm	± 1% relative	(6) I-PB-352
In Nitrogen				19-Apr-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	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	5-Apr-2024
FTIR Spectrometers Nicolet iS50	FTIR-NO	5-Apr-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 Parinyasoonorn
Signatory for and on behalf of Linde (Thailand) Co., Ltd.

Page 1 of 1

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PB-002/F006

Iss: M/1, 01 December 2023

บริษัท ลินด์ (ประเทศไทย) จำกัด (มหาชน)

เลขที่จดทะเบียนการค้า 01073700035

ชั้น 15 อาคารทาวเวอร์ เอ 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 ตำบลบางพลีใหญ่ อำเภอบางพลี จังหวัดสมุทรปราการ 24180

โทรศัพท์ (66) 38.570-479-93

โทรสาร (66) 38.570-323

Linde (Thailand) Public Company Limited

P.L.C. Registration no 01073700035

15th 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

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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:	0609/23	Date of Issue:	21-Mar-2023	Expiry date:
Material Details				21-Mar-2031
Production Order:	90176409	Material Code:	445100-SK-44	Cylinder No.:
Gas content:	5.52 M ³	Filling pressure:	145.0 bar	D869455
Cylinder Owner:	LINDE	Cylinder Material:	Spectra seal	Valve:
				CGA 660 SS
				Cylinder Size:
				40 L

Laboratory Report

Analytical Result				
Component	Normal Concentration	Analysis Result ¹	Uncertainty ²	Method of Analysis ³
Sulphur Dioxide	80.0 ppm	83.5 ppm	± 1% relative	(6) I-PB-352
In Nitrogen				14-Mar & 21-Mar-23

Reference Standard used in Assay

Reference Standard	Cylinder number	Concentration	Expiry date:
Sulphur Dioxide	256240	52.73 ± 0.42 ppm	6-May-2023
In Nitrogen			

Analytical Instruments used in Assay

Instrument/Make/Model	Analytical Principle	Last Multipoint Calibration
FTIR Spectrometers Nicolet iS50	FTIR-SO2	16-Feb & 17-Mar-23

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 Parinyasoonorn
Signatory for and on behalf of Linde (Thailand) Co., Ltd.

Page 1 of 1

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บริษัท ลินด์ (ประเทศไทย) จำกัด (มหาชน)

เลขที่จดทะเบียนการค้า 01073700035

ชั้น 15 อาคารทาวเวอร์ เอ 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 ตำบลบางพลีใหญ่ อำเภอบางพลี จังหวัดสมุทรปราการ 24180

โทรศัพท์ (66) 38.570-479-93

โทรสาร (66) 38.570-323

Linde (Thailand) Public Company Limited

P.L.C. Registration no 01073700035

15th 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

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Customer Details		Address:	Customer Tag No.:
Name:	Secot Co., Ltd.	239, Rimklongprapa Rd., Bangsue, Bangkok 10800	

Certificate Details		Date of Issue:	Expiry date:
Number:	2658/24	26-Aug-2024	26-Aug-2027
Material Details		Material Code:	Cylinder No.:
Production Order:	90185789	411800-AL-44	D900850
Gas content:	6,900 M ³	Filling pressure:	145 bar
Cylinder Owner:	LINDE	Cylinder Material:	Aluminum
		Valve:	CGA 660 SS
		Cylinder Size:	50 L

Laboratory Report		Analytical Result		Method of Analysis ³	Assay Date
Component	Nominal Concentration	Analysis Result ¹	Uncertainty ²		
Nitric Oxide	200 ppm	202 ppm	± 1% relative	(6) I-PB-352	14 & 23-Aug-2024
Other Nox impurity in Nitrogen		Less than 10.1 ppm			

Reference Standard used in Assay		Expiry date:
Reference Standard	Cylinder number	
Nitric Oxide in Nitrogen	ALWA2548	26.1.4 ± 1.3 ppm
		30-Apr-2026

Analytical Instruments used in Assay		Last Multipoint Calibration
Instrument/Make/Model	Analytical Principle	
FTIR Spectrometers Nicolet iS50	FTIR-NO	25-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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PB-002/F006

Iss: M/1, 01 December 2023

บริษัท ลินด์ (ประเทศไทย) จำกัด (มหาชน)

เลขที่ใบอนุญาตประกอบกิจการ: 0101521000785

ชั้น 15 อาคารทาวเวอร์ เอ 2/3 หมู่ 14 ถนนบางนา-ตราด กม. 6.5 แขวงบางนา
บางพลี เขตอุตสาหกรรม 10540 กรุงเทพมหานคร (66) 2338-6100 โทรสาร (66) 2338-6333
โรงงานผลิต: 105 หมู่ 5 ตำบลบางพลีใหญ่ อำเภอบางพลี จังหวัดสมุทรปราการ 24180
โทรสาร (66) 38.570-479-93 โทรสาร (66) 38.570-323

Linde (Thailand) Public Company Limited

P.C. Registration No. 0101521000785

15th Floor, Bangna Tower A, 2/3 Moo 14, Bangna Trad KM. 6.5 Road, Bangkwa
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		Address:	Customer Tag No.:
Name:	Secot Co., Ltd.	239, Rimklongprapa Rd., Bangsue, Bangkok 10800	

Certificate Details		Date of Issue:	Expiry date:
Number:	2135/20	19-May-2020	18-May-2028
Material Details		Material Code:	Cylinder No.:
Production Order:	90160199	477200-AL-44	D595120
Gas content:	6.90 M ³	Filling pressure:	145.0 bar
Cylinder Owner:	LINDE	Cylinder Material:	Aluminum
		Valve:	CGA 660 SS
		Cylinder Size:	50 L

Laboratory Report		Analytical Result		Method of Analysis ³	Assay Date
Component	Nominal Concentration	Analysis Result ¹	Uncertainty ²		
Sulphur Dioxide in Nitrogen	800 ppm	802 ppm	± 1% relative	(6) I-PB-352	12-May & 19-May-20

Reference Standard used in Assay		Expiry date:
Reference Standard	Cylinder number	
Sulphur Dioxide in Nitrogen	26583856	514.9 ± 2.4 ppm
		18-Dec-2020

Analytical Instruments used in Assay		Last Multipoint Calibration
Instrument/Make/Model	Analytical Principle	
FTIR Spectrometers Nicolet iS50	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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PB-002/F006

บริษัท ลินด์ (ประเทศไทย) จำกัด (มหาชน)

เลขที่ใบอนุญาตประกอบกิจการ: 0101521000785

ชั้น 15 อาคารทาวเวอร์ เอ 2/3 หมู่ 14 ถนนบางนา-ตราด กม. 6.5 แขวงบางนา
บางพลี เขตอุตสาหกรรม 10540 กรุงเทพมหานคร (66) 2338-6100 โทรสาร (66) 2338-6333
โรงงานผลิต: 105 หมู่ 5 ตำบลบางพลีใหญ่ อำเภอบางพลี จังหวัดสมุทรปราการ 24180
โทรสาร (66) 38.570-479-93 โทรสาร (66) 38.570-323

Linde (Thailand) Public Company Limited

P.C. Registration No. 0101521000785

15th Floor, Bangna Tower A, 2/3 Moo 14, Bangna Trad KM. 6.5 Road, Bangkwa
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: 0530/23 Date of Issue: 7-Mar-2023 Expiry date: 7-Mar-2026
Material Details
Production Order: 90176407 Material Code: 436700-SK-34 Cylinder No.: A00929SK
Gas content: 5.23 M³ 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	Nominal Concentration	Analysis Result ¹	Uncertainty ²	Method of Analysis ³	Assay Date
Nitric Oxide	80.0 ppm	79.8 ppm	± 1% relative	(6) I-PB-352	27-Feb & 7-Mar-23
Other NOx impurity		Less than 3.9 ppm			
Carbon Monoxide	80.0 ppm	81.1 ppm	± 1% relative	(6) I-PB-352	27-Feb-2023
In Nitrogen					

Reference Standard used in Assay

Reference Standard	Cylinder number	Concentration	Expiry date:
Nitric Oxide	2560035G	50.89 ± 0.41 ppm	13-Dec-2024
Carbon Monoxide	ND46423	50.20 ± 0.26 ppm	4-May-2024
In Nitrogen			

Analytical Instruments used in Assay

Instrument/Make/Model	Analytical Principle	Last Multipoint Calibration
FTIR Spectrometers Nicolet iS50	FTIR-NO	27-Jan & 1-Mar-23
FTIR Spectrometers Nicolet iS50	FTIR-CO	22-Feb-2023

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)

ชั้น 15 อาคารทาวเวอร์ 2/3 หมู่ 14 ถนนบางนา-ตราด กม. 6.5 แขวงบางนา
อ.บางนาเขตบางนา กรุงเทพมหานคร 10540 โทรศัพท์ (66) 2338-6100 โทรสาร (66) 2338-6333
โทรสารแฟกซ์: 105 หมู่ 5 แขวงบางนา เขตบางนา กรุงเทพมหานคร 24180
โทรศัพท์ (66) 38.570-479-93 โทรสาร (66) 38.570-323

Sukanya Parinyasoonorn

Signatory for and on behalf of Linde (Thailand) Co., Ltd.

Linde (Thailand) Public Company Limited
P.L.C. Registration No. 0107537000785
15th 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

PB-002/F006

Iss:K/2, 15 Oct 2021

Making our world more productive

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: 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.: A00987SK
Gas content: 6.900 M³ 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 ¹	Uncertainty ²	Method of Analysis ³	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	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 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

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Sukanya Parinyasoonorn

Signatory for and on behalf of Linde (Thailand) Co., Ltd.

PB-002/F006

Iss:M/1, 01 December 2023

บริษัท ลินด์ (ประเทศไทย) จำกัด (มหาชน)

P.L.C. Registration No. 0107537000785

ชั้น 15 อาคารทาวเวอร์ 2/3 หมู่ 14 ถนนบางนา-ตราด กม. 6.5 แขวงบางนา
อ.บางนาเขตบางนา กรุงเทพมหานคร 10540 โทรศัพท์ (66) 2338-6100 โทรสาร (66) 2338-6333
โทรสารแฟกซ์: 105 หมู่ 5 แขวงบางนา เขตบางนา กรุงเทพมหานคร 24180
โทรศัพท์ (66) 38.570-479-93 โทรสาร (66) 38.570-323

Linde (Thailand) Public Company Limited

P.L.C. Registration No. 0107537000785

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Bangplee, Samutprakarn 10540, Tel (66) 2338-6100 Fax (66) 2338-6333
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Thailand, Tel (66) 38.570-479-93 Fax (66) 38.570-323

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.: A00940SK
Gas content: 5.52 M³ 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 ¹	Uncertainty ²	Method of Analysis ³	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 recognized 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.

Linde (Thailand) Public Company Limited PB-002/F006
P.C. Registration No. 01033700085
15th Floor, Bangna Tower A, 2/3 Moo 14, Bangna Trad KM. 6.5 Road, Bangkew
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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 M³ 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 ¹	Uncertainty ²	Method of Analysis ³	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	133261SG	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.

Linde (Thailand) Public Company Limited PB-002/F006
P.C. Registration No. 01033700085
15th Floor, Bangna Tower A, 2/3 Moo 14, Bangna Trad KM. 6.5 Road, Bangkew
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Wellgrow Plant: 105 Moo 5, T.Bangsamak, A.Bangpakong, Chachoengsao 24180
Thailand, Tel (66) 38.570-479-93 Fax (66) 38.570-323

Certificate Of Analysis
Special Gases Mixture

Customer Details

Name: Secot Co., Ltd. Address: 239 Rimklongprapa Rd. Bangsue Khel Bangsue Bangkok 10800 Customer Tag No.:

Certificate Details

Number: 0483/23 Date of Issue: 22-Feb-2023 Expiry date: 21-Feb-2027
Material Details
Production Order: 90176403 Material Code: 478100-J-62 Cylinder No.: 51108
Gas content: 6.520 M³ (nominal) Filling pressure: 145 bar (g) Valve: CGA 590 BRASS
Cylinder Owner: LINDE Cylinder Material: STEEL Cylinder Size: 47 L

Laboratory Report

Component	Normal Concentration	Analysis Result ¹	Uncertainty ²	Method of Analysis ³
Oxygen in Nitrogen	8.00%	7.93%	± 2% relative	(1) 5G-O-01

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.

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PB-002/F004
Iss:K/2, 15 Oct 2021

บริษัท ลินด์ (ประเทศไทย) จำกัด (มหาชน)

เลขที่ใบอนุญาต: 010737700761

ชั้น 15 อาคารทาวเวอร์ 10 2/3 หมู่ 14 ถนนบางนา-ตราด กม. 6.5 แขวงบางนา

Bangplee, Samutprakarn 10540, Tel (66) 2338-6100 โทรสาร (66) 2338-6333

โรงงานผลิต: 105 หมู่ 5 ตำบลบางพลีใหญ่ อำเภอบางพลี จังหวัดสมุทรปราการ 24180

โทรสาร (66) 38 570-479-93 โทรสาร (66) 38 570-323

Linde (Thailand) Public Company Limited

P.L.C. Registration No. 010737700761

15th 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

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: 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 M³ 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 ¹	Uncertainty ²	Method of Analysis ³	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 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.

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PB-002/F006

Iss:K/2, 15 Oct 2021

บริษัท ลินด์ (ประเทศไทย) จำกัด (มหาชน)

เลขที่ใบอนุญาต: 010737700761

ชั้น 15 อาคารทาวเวอร์ 10 2/3 หมู่ 14 ถนนบางนา-ตราด กม. 6.5 แขวงบางนา

Bangplee, Samutprakarn 10540, Tel (66) 2338-6100 โทรสาร (66) 2338-6333

โรงงานผลิต: 105 หมู่ 5 ตำบลบางพลีใหญ่ อำเภอบางพลี จังหวัดสมุทรปราการ 24180

โทรสาร (66) 38 570-479-93 โทรสาร (66) 38 570-323

Linde (Thailand) Public Company Limited

P.L.C. Registration No. 010737700761

15th 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: 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 M³ 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 ¹	Uncertainty ²	Method of Analysis ³	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 expiry 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

Sukanya Parinyasoonporn
Signatory for and on behalf of Linde (Thailand) Co., Ltd.

Linde (Thailand) Public Company Limited

15th Floor, Bangna Tower A, 2/3 Moo 14, Bangna Trad KM. 6.5 Road, Bangkok
Bangplee, Samyprakarn 10540, Tel (66) 2338-6100 Fax (66) 2338-6333
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PB-002/F006

Iss: K/2, 15 Oct 2021

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บริษัท ลินด์ (ประเทศไทย) จำกัด (มหาชน)

เลขที่ใบอนุญาต: 010737000745

ชั้น 15 ถนนบางนาตราด กม. 6.5 แขวงบางนา

เขตคลองเตย กรุงเทพมหานคร 10540 โทรศัพท์ (66) 2338-6100 โทรสาร (66) 2338-6333

โรงงานผลิต: 105 หมู่ 5 ตำบลบางสีทอง อำเภอบางปะกง จังหวัดฉะเชิงเทรา 24180

โทรศัพท์ (66) 38.570-479-93

โทรสาร (66) 38.570-323

Airgas.
an Air Liquide companyAirgas Specialty Gases
Airgas USA, LLC
600 Union Landing Road
Chinninstown, NJ 08077-0000
Airgas.com

CERTIFICATE OF ANALYSIS

Grade of Product: EPA Protocol

Part Number: E04NI99E15AC084 Reference Number: 82-401409170-1
Cylinder Number: EB0102328 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	50.88 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	13080205	CC401847	4950 PPM CARBON MONOXIDE/NITROGEN	+/- 0.4%	Feb 15, 2019
PRM	12367	APEX1088237	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	CG506710	4.971 PPM NITROGEN DIOXIDE/NITROGEN	+/- 2.0%	Nov 14, 2019
NTRM	14010327	KAL004378	49.08 PPM SULFUR DIOXIDE/NITROGEN	+/- 1.0%	Apr 17, 2024

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

ANALYTICAL EQUIPMENT		
Instrument/Make/Model	Analytical Principle	Last Multipoint Calibration
Siemens Ultramat 6 J3-559 COHIGH	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 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 shall not be reproduced in full without written approval of the issuer.



TESTING CERT No. 3082.05

Approved for Release

Page 1 of 82-401409170-1

Sheet No. : BH-001-1/2025(P)



High Volume TSP&PM10 Calibration Data Sheet

Date:

15 Jan 25

Temp (°C):

22

Barometric pressure (mm Hg):

763

Reference Standard Calibration

Equipment:

Orifice

Model No:

TE-5025A

Serial No:

4218

Manufacturer:

Tisch

Unit Under Test

Equipment:

High Volume Air Sampler

Model No:

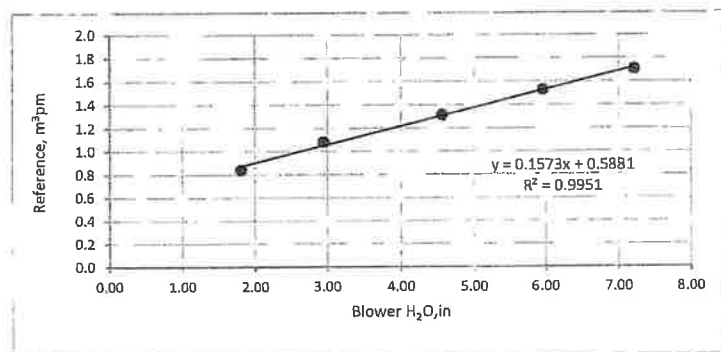
TE-5009X

Serial No:

BH-001

Calibrated by : Surachat I.

Test No.	Orifice (in)	Qstd (m ³ /min)	Reading (in)	Reading(Corrected) (in)
1	12.53	1.707	7.16	7.21
2	10.04	1.530	5.92	5.96
3	7.39	1.316	4.53	4.56
4	4.98	1.084	2.93	2.95
5	2.96	0.841	1.79	1.80



Approved by :

Sheet No. : BH-026-1/2025(P)



High Volume TSP&PM10 Calibration Data Sheet

Date:

10 Jan 25

Temp (°C):

31

Barometric pressure (mm Hg):

760

Reference Standard Calibration

Equipment:

Orifice

Model No:

TE-5025A

Serial No:

4218

Manufacturer:

Tisch

Unit Under Test

Equipment:

High Volume Air Sampler

Model No:

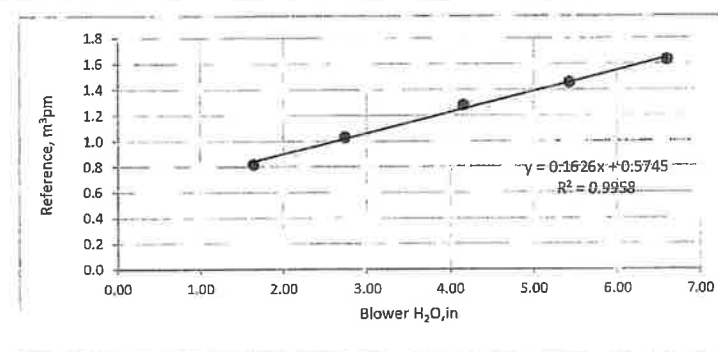
TE-5009X

Serial No:

BH-026

Calibrated by : Surachat I.

Test No.	Orifice (in)	Qstd (m ³ /min)	Reading (in)	Reading(Corrected) (in)
1	11.84	1.632	6.67	6.60
2	9.38	1.455	5.48	5.43
3	7.22	1.279	4.2	4.16
4	4.65	1.031	2.76	2.73
5	2.90	0.819	1.66	1.64



Approved by :

Sheet No. : BH-007-1/2025(P)



High Volume TSP&PM10 Calibration Data Sheet

Date: 16 Jan 25

Temp (°C): 30

Barometric pressure (mm Hg): 760

Reference Standard Calibration

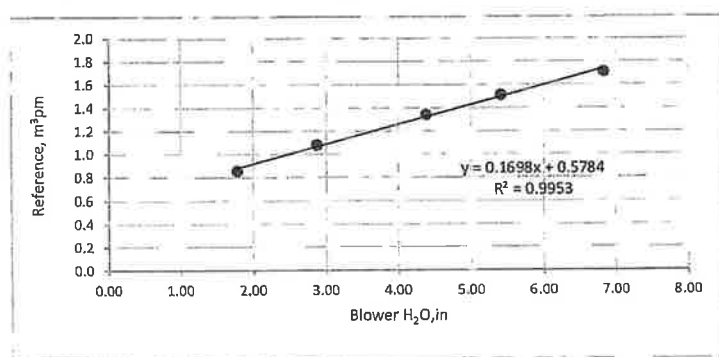
Equipment: Orifice
 Model No: TE-5025A
 Serial No: 4218
 Manufacturer: Tisch

Unit Under Test

Equipment: High Volume Air Sampler
 Model No: TE-5009X
 Serial No: BH-007

Calibrated by : Surachat I.

Test No.	Orifice (in)	Qstd (m ³ /min)	Reading (in)	Reading(Corrected) (in)
1	13.03	1.714	6.89	6.83
2	10.10	1.512	5.45	5.40
3	7.94	1.343	4.42	4.38
4	5.12	1.082	2.9	2.88
5	3.15	0.854	1.79	1.78



Approved by :

Sheet No. : BH-005-1/2025(P)



High Volume TSP&PM10 Calibration Data Sheet

Date: 13 Jan 25

Temp (°C): 19

Barometric pressure (mm Hg): 763

Reference Standard Calibration

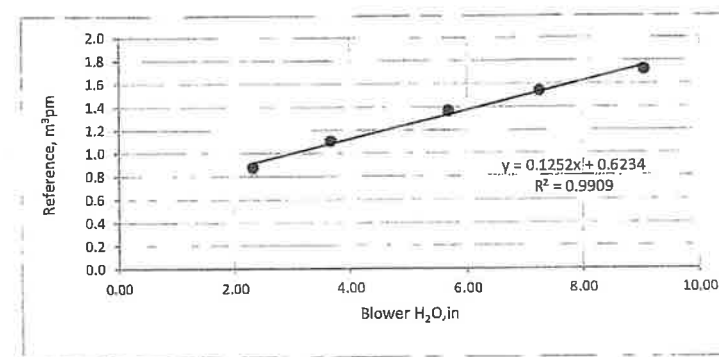
Equipment: Orifice
 Model No: TE-5025A
 Serial No: 4218
 Manufacturer: Tisch

Unit Under Test

Equipment: High Volume Air Sampler
 Model No: TE-5009X
 Serial No: BH-005

Calibrated by : Surachat I.

Test No.	Orifice (in)	Qstd (m ³ /min)	Reading (in)	Reading(Corrected) (in)
1	12.70	1.727	8.94	9.05
2	10.10	1.542	7.16	7.25
3	7.91	1.367	5.61	5.68
4	5.14	1.106	3.62	3.66
5	3.18	0.875	2.29	2.32



Approved by :



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.: CP20250074EA

Operation No.: CP2025020068

Certificate of Calibration

Equipment: Sound Calibrator

Manufacturer: Cirrus Research Plc

Model/Type: CR:515

Serial No.: 94296

ID No.: -

Customer: SECOT Co.,Ltd.

Address: 239 Rimklongprapa Rd., Bangsue,
Bangkok 10800 Thailand

Received Date: 19 February 2025

Calibrated Date: 27 February 2025

Issued Date: 28 February 2025

Calibrated by: Ms. Juntaporn Kunhakom

Approved by: _____

(Mr. Sittichai Swaksuriyawong)
Group Manager

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ELECTRICAL AND ELECTRONICS INSTITUTE
FOUNDATION FOR INDUSTRIAL DEVELOPMENT

Certificate No.: CP20250074EA

Calibration Report

Equipment: Sound Calibrator
Manufacturer: Cirrus Research Plc
Model/Type: CR:515
Serial No.: 94296
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	4079144	E1U2402195	23 May 2025
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; NSQ Accredited Calibration No.0119

- NA Caltechnologies Co., Ltd.; ANAB Accredited Calibration No.AC-2658.

Result of Calibration:-

1. Function : Sound pressure level

Nominal Frequency (Hz)	Specified Sound Pressure level (dB)	Measured value (dB)	Deviated value ^[1] (dB)	Acceptance limit ^[3] (dB)
1000	94	93.86	-0.14	±0.25

2. Function : Frequency

Nominal Sound Pressure level (dB)	Specified Frequency (Hz)	Measured value (Hz)	Deviated value ^[2] (%)	Acceptance limit ^[3] (%)
94	1000	1000.34	0.03	±0.70

Certificate No.: CP20250074EA

Calibration Report

3. Function : Total distortion + noise

Normal	Normal	Measured value ^[4]	Acceptance limit ^[5]
Sound Pressure level (dB)	Frequency (Hz)	(%)	(%)
94	1000	0.72	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 --



SOUND LEVEL METER CALIBRATION

Calibration Location: SECOT

Calibration Date: Nov 24, 25

ACOUSTIC CALIBRATOR

Brand	Model	Serial No.	Frequency (Hz)	Ref. Calibrated (dB)	Eff. Calibrated (dB)
Cirrus	CR:515	94296	1000.00	94.0	93.7

No.	Brand	Model	Serial No.	Reading (dB)	dB Adjust
15	Cirrus	CR162B	G300769	93.7	0.0
24	Cirrus	CR162C	G300832	93.7	0.0
26	Cirrus	CR162C	G300841	93.7	0.0
42	Cirrus	CR162B	G302738	93.7	0.0
55	Cirrus	CR161B	G303830	93.7	0.0
57	Cirrus	CR161B	G303827	93.7	0.0
58	Cirrus	CR161B	G303833	93.7	0.0

Calibrated by :



Approved by :

Preeda S.



SOUND LEVEL METER CALIBRATION

Calibration Location: SECOT

Calibration Date: Nov 24, 25

ACOUSTIC CALIBRATOR

Brand	Model	Serial No.	Frequency (Hz)	Ref. Calibrated (dB)	Eff. Calibrated (dB)
Cirrus	CR:515	94296	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
4	SCARLET	ST-21D	820725	93.8	0.0
5	SCARLET	ST-21D	820726	93.8	0.0

Calibrated by :

Approved by :

Preeda S.



SOUND LEVEL METER CALIBRATION

Calibration Location: SECOT

Calibration Date: Nov 6, 25

ACOUSTIC CALIBRATOR

Brand	Model	Serial No.	Frequency (Hz)	Ref. Calibrated (dB)	Eff. Calibrated (dB)
Cirrus	CR:515	94296	1000.00	94.0	93.8

No.	Brand	Model	Serial No.	Reading (dB)	dB Adjust
3	SCARLET	ST-21D	820724	93.8	0.0
4	SCARLET	ST-21D	820725	93.8	0.0
6	SCARLET	ST-21D	820727	93.8	0.0
8	SCARLET	ST-21D	820729	93.8	0.0
9	SCARLET	ST-21D	820730	93.8	0.0
11	SCARLET	ST-21D	821078	93.8	0.0
12	SCARLET	ST-21D	821079	93.8	0.0
13	SCARLET	ST-21D	821080	93.8	0.0

Calibrated by :

Approved by :

Sulei Suthamon



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



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

Normalal Frequency (Hz)	Specified Sound Pressure level (dB)	Measured value (dB)	Deviated value ^[1] (dB)	Acceptance limit ^[3] (dB)
1000	94	94.09	0.09	±0.25

2. Function : Frequency

Normalal Sound Pressure level (dB)	Specified Frequency (Hz)	Measured value (Hz)	Deviated value ^[2] (%)	Acceptance limit ^[3] (%)
94	1000	1000.31	0.03	±0.70

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

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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 ^[4] (%)	Acceptance limit ^[5] (%)
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-515-2025-191



SOUND LEVEL METER CALIBRATION

Calibration Location: SECOT

Calibration Date: Aug 14, 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
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
9	SCARLET	ST-21D	820730	93.8	0.0
10	SCARLET	ST-21D	820731	93.8	0.0
12	SCARLET	ST-21D	821079	93.8	0.0
13	SCARLET	ST-21D	821080	93.8	0.0
15	SCARLET	ST-21D	821082	93.8	0.0

Calibrated by :

Approved by :

CERTIFICATE OF CALIBRATION

ISSUED BY **Noisemeters**

DATE OF ISSUE **26 February 2025** CERTIFICATE NUMBER **234084**

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



NOISE DOSE METER CALIBRATION

Calibration Location: SECOT

Calibration Date: Aug 14, 25

ACOUSTIC CALIBRATOR

Brand	Model	Serial No.	Calibrated (dB)	Frequency (Hz)
CIRRUS	RC 110A	95167	114.00	1000

No.	Brand	Model	Serial No.	Reading (dB)	dB Adjust
1	Cirrus	CR110A	CB1047	113.6	0.4
2	Cirrus	CR110A	CB1056	113.5	0.5
3	Cirrus	CR110A	CB1103	113.8	0.2

Calibrated by :

Approved by :



NOISE DOSE METER CALIBRATION

Calibration Location: SECOT

Calibration Date: Sep 11, 25

ACOUSTIC CALIBRATOR

Brand	Model	Serial No.	Calibrated (dB)	Frequency (Hz)
CIRRUS	RC 110A	95167	114.00	1000

No.	Brand	Model	Serial No.	Reading (dB)	dB Adjust
1	Cirrus	CR110A	CB1041	113.6	0.4
2	Cirrus	CR110A	CB1042	113.6	0.4

Calibrated by :

Approved by :



NOISE DOSE METER CALIBRATION

Calibration Location: SECOT

Calibration Date: Nov 6, 25

ACOUSTIC CALIBRATOR

Brand	Model	Serial No.	Calibrated (dB)	Frequency (Hz)
CIRRUS	RC 110A	95167	114.00	1000

No.	Brand	Model	Serial No.	Reading (dB)	dB Adjust
1	Cirrus	CR110A	CB1023	113.8	0.2
2	Cirrus	CR110A	CB1025	113.8	0.2
3	Cirrus	CR110A	CB1026	116.1	-2.1

Calibrated by :

Approved by :

CERTIFICATE OF CALIBRATION

ISSUED BY Noisemeters

DATE OF ISSUE 02 April 2025

CERTIFICATE NUMBER 237347

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: 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:

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CERTIFICATE OF CALIBRATION

Certificate Number:
237347

Page 2 of 2

Sheet No. : **NC-PULSAR-2025-121**

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	114.07	0.07	±0.75	0.11 dB
Distortion (%)	< 4.00	0.50	0.50	0.49	0.50	0.50	+4.00	0.13 %
Frequency (Hz)	1000.0	998.9	998.9	998.9	998.9	-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	113.99	-0.01	±0.75	0.11 dB
Distortion (%)	< 4.00	0.49	0.49	0.49	0.49	0.49	+4.00	0.13 %
Frequency (Hz)	1000.0	998.9	998.9	998.9	998.9	-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



NOISE DOSE METER CALIBRATION

Calibration Location: **SECOT**

Calibration Date: **Nov 6, 25**

ACOUSTIC CALIBRATOR

Brand	Model	Serial No.	Calibrated (dB)	Frequency (Hz)
PULSAR	22R	79781	114.00	1000

No.	Brand	Model	Serial No.	Reading (dB)	dB Adjust
1	Pulsar	22	PB617	113.6	0.4
2	Pulsar	22	PB632	114.1	-0.1

Calibrated by :

Approved by :



THAI CALIBRATION SERVICES CO., LTD.

19/8 Moo 9 Soi Raiking 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.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
Model : AG245
Accuracy class : -
Capacity : 41 g / 210 g
Resolution : 0.00001 g / 0.0001 g
Serial No. : 1117293916
ID No. : -
Place of calibration : LAB

Order No. : 68S1723-1
Ambient temperature : (25.3 ± 5.0) °C
Relative humidity : (39.9 ± 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 ³)
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-ONSAC 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.

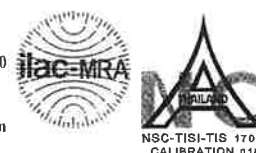


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CALIBRATION CERTIFICATE

Certificate No.S2504633S

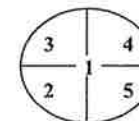
page 2 of 2

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 (±) (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 , 6th 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 Calibration Services CO., LTD.

Ambient Condition : Temperature 24.42-25.02 °C

Humidity 49.2-51.2 % RH

Calibrated By : *Khemchuda Insorn* Approved By : *Narisa 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

3. Departure from Nominal Value :

Reading (g)	Correction (g)	Uncertainty (+/- g)
0	0.00000	± 0.00007
1	+ 0.00003	± 0.00007
5	+ 0.00010	± 0.00010
10	+ 0.00004	± 0.00008
20	+ 0.00009	± 0.00010
40	+ 0.00002	± 0.00010
60	+ 0.00010	± 0.00011
80	+ 0.00013	± 0.00014
100	+ 0.00018	± 0.00016
120	+ 0.00019	± 0.00018
140	+ 0.00018	± 0.00020
160	+ 0.00017	± 0.00022
180	+ 0.00015	± 0.00024
200	+ 0.00019	± 0.00027

Calibrated by : *Khemchuda Insorn*

(Miss Khemchuda Insorn)

Testing Officer

Date : *19/05/2025*Approved By : *Narisa Poowasanpetch*

(Miss Narisa Poowasanpetch)

Chief of Technical Management

Date : *23/05/2025*

Issued Date : May 23, 2025



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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 \pm 5.0) °C
Relative humidity : (39.3 \pm 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 ³)
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
TechnicianApproved Signatory : *Somwang Wongduang*

Somwang Wongduang

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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

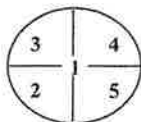
page 2 of 2

The repeatability of indication

Nominal Value (g)	Standard Deviation of reading (g)	Maximum difference between successive 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--



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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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 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



Bangkok High Lab Co.,Ltd.
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Tel: (662) 971-5800 Fax: (662) 971-5300
Website: www.bangkokhighlab.com E-mail: info@bangkokhighlab.com



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



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. 9119741

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



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.: 2503897-003-01
Client name: SECOT CO., LTD.
Address: 239 Rimklongprapa Road,
Bangsue, Bangsue, Bangkok 10800

Page 1 of 3

Equipment: CHAMBER (Hot Air Oven)
Manufacturer: BINDER
Model: ED 53
Serial No.: 01-27152
ID No.: N/A
Order No.: 2503897
Operation No.: 2503897-003
Date of Receipt: 14 July 2025
Date of Calibration: 14 July 2025

Calibrated by

Mr.Yothin Charoensuk
Scientist

Approved by

(Mr.Pheraphat Tuanjit)

Manager, Division of Calibration Laboratory

Date of Issue:

17 July 2025

Responsible for the Technical Management Team

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.: 2503897-003-01
Equipment: CHAMBER (Hot Air Oven)
Model: ED 53 **Serial No.:** 01-27152
Resolution: 1 °C **ID No.:** N/A
Manufacturer: BINDER
Date of Calibration: 14 July 2025

Page 2 of 3

Location: Laboratory, SECOT CO., LTD.
Environment Condition: Ambient Temperature (32.0 ± 1) °C
Relative Humidity (60.9 ± 1) %
Line Voltage (222.5 ± 3) 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.
- Reference Standard Instrument :

Instrument	Model	Serial No./ID No.	Certificate No.	Due Date	Through
Digital Thermometer with sensor	34972A	MY57003188	2503175-002	2 June 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 104,110 and 180 °C
Fresh air Damper - Open Position -
X Close Fan -
- Not Available

- Result of Calibration : ☒ Without adjustment ☐ After adjustment

F-CS-012 Revision: 01 Date: 20-04-65



Calibration Certificate

Calibration Report

Certificate No.: 2503897-003-01
Equipment: CHAMBER (Hot Air Oven)
Model: ED 53 **Serial No.:** 01-27152
Resolution: 1 °C **ID No.:** N/A
Manufacturer: BINDER

Date of Calibration: 14 July 2025

Page 3 of 3

Calibration point: 104,110 and 180 °C

Calibration result:

Calibration Condition	Temperature (°C)	Relative Humidity (%)	Line Voltage (Volt)
MIN	31.2	60.3	220.0
MAX	32.5	61.5	225.0

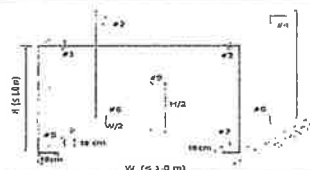


Table1 : Reporting of Temperature

Calibration point (°C)	Measured Temperature (°C) @ Sensor No. (Sensor No.9 is REF)									Uncertainty ± (°C)
	# 1	# 2	# 3	# 4	# 5	# 6	# 7	# 8	# 9	
104	104.25	104.72	104.26	104.20	103.90	103.85	103.76	103.75	103.82	0.72
110	110.30	110.88	110.27	110.23	110.07	110.04	109.87	109.92	109.54	0.79
180	180.48	180.72	179.88	180.30	179.84	180.53	179.82	180.16	179.38	0.90

Table 2 : Reporting of Characterization Result

UUC* Setting (°C)	UUC* Reading (°C)			Stability ± (°C)	Uniformity (°C)	Overall Variation (°C)
	MIN	MAX	Average			
104	104	104	104	0.12	0.90	1.2
110	110	110	110	0.23	1.3	1.6
176	176	176	176	0.23	1.3	1.8

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 -----




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

- 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

Page 3 of 3

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

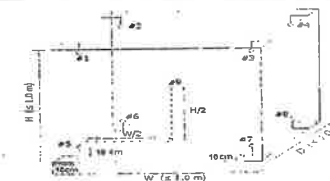


Table1 : Reporting of Temperature

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 -----





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.: 25CH1009
Page.: 1 of 3

Equipment : pH Meter
Manufacturer : Mettler Toledo
Model : Seven2Go
Serial No. : B924795409
ID No. : ID.12
Condition As-Received: Used Item
Received Date : 26 August 2025
Calibration Date : 27 August 2025
Reference : 2508-0784DN-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 : Walalak Sirithean

Approved by :

Saithip
Approved Signatory

() Chakrit Waewwanjua
() Ponpan Paipim
(✓) Saithip Meangmai

Issue Date : 28 August 2025

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.: 25CH1009
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	58440003	130RC120	24E3731	25 Nov 2025
2) Ref. Standard Thermometer	4982054	110RC044	25I708	03 July 2026

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

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

Buffer Solution	Manufacturer	Lot No.	Exp. date
pH 4.007	CPA chem	1114384	12 June 2027
pH 6.987	CPA chem	1034204	27 Sep 2025
pH 10.010	CPA chem	1114385	08 June 2026

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	177	4.00	0.58	2.00
S/N.: B924795409	7.00	0.00	0	7.00	0.58	2.00
	10.00	-177.48	-177	10.00	0.58	2.00



Cert.No.: 25CH1009

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	4.007	4.02	182	0.0071	2.00
S/N.: 4320459	6.987	7.00	6	0.0095	2.00
	10.010	10.01	-167	0.0092	2.00

Function : Temperature Measurement

(*) Without adjustment

This equipment was connected with Temperature Probe;

- Model : InLab Expert Go

- Serial No. : 4320459

Dimension of probe

- Length : 120 mm.

- Diameter : 12 mm.

- Immersion Depth : 100 mm.

Calibration Point ($^{\circ}\text{C}$)	Standard Temperature ($^{\circ}\text{C}$)	UUC* Reading ($^{\circ}\text{C}$)	Error ($^{\circ}\text{C}$)	Uncertainty of measurement (\pm $^{\circ}\text{C}$)	Coverage factor k
25.0	24.999	25.1	0.101	0.13	2.00
30.0	30.001	30.2	0.199	0.13	2.00
35.0	35.001	35.2	0.199	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.: 25TW169

Page.: 1 of 2

Equipment : DO Meter
Manufacturer : Hanna
Model : HI98193
Serial No. : 08300004101
ID No. : ID.11
Received Date : 26 August 2025
Test Date : 27 August 2025
Reference : 2508-0784DN-1
Submitted by : Secot Co.,Ltd.
239 Rimklongprapa Road,
Bangsue, Bangkok 10800
Laboratory Condition : Temperature (25 ± 5) $^{\circ}\text{C}$
Humidity (50 ± 20) %
Test Procedure : In - house method : CP-CH9
by Comparison Technique with Azide Modification Method

Tested by : Walalak Sirlthean

Approved by : 
Approved Signatory

() Chakrit Waewwanjua
() Ponpan Paipim
(☒) Saithip Meangmai

Issue Date : 28 August 2025



Cert.No.: 25TW169

Page.: 2 of 2

Condition of this result of calibration

1. Reference Standard Instruments :

This measurement result is traceable to the International System of Unit through the reference standards laboratory of Industrial Calibration Center, Technology Promotion Association (Thailand-Japan).

<u>Instruments</u>	<u>ID No.</u>	<u>Certificate No.</u>	<u>Due Date</u>
1. Burette	130BU10	25CG1126	18 Mar 2027
2. Balance	110RC001	25MM316	02 July 2026

2. Standard Material :-

<u>Material</u>	<u>Manufacturer</u>	<u>Lot.No.</u>	<u>Assay</u>
Sodium Thiosulfate 5-Hydrate AR	KEMAUS	2203162447	99.6%

Result : Dissolved Oxygen Meter Adjustment With Air 100 %
Dissolved Oxygen Probe No.: KC1N60V7R

<u>Titration Method</u> (Azide Modification Method) (mg/L)	<u>DO Meter</u> <u>Reading</u> (mg/L)	<u>Standard Deviation</u> (mg/L)
8.20	8.20	0.0055

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

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อุตสาหกรรมพัฒนาอุตสาหกรรม
ศูนย์บริการห้องปฏิบัติการอุตสาหกรรมอาหาร
Foundation for Industrial Development National Food Institute
Food Industrial Laboratory Service Center




Calibration Certificate

Certificate No.: 2503897-001-01
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.: 2503897
Operation No.: 2503897-001
Date of Receipt: 14 July 2025
Date of Calibration: 14 July 2025

Calibrated by Mr.Yothin Charoensuk
Scientist

Approved by 
(Mr.Pheraphat Tuanjit)
Manager, Division of Calibration Laboratory
Responsible for the Technical Management Team

Date of Issue: 17 July 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.

F-CS-009 Revision: 01 Date: 20-04-55



Calibration Report

Certificate No.: 2503897-001-01
Equipment: CHAMBER (Incubator)
Model: ICP 400 Serial No.: K406.0004
Resolution: 0.1 °C ID No.: N/A
Manufacturer: MEMMERT
Date of Calibration: 14 July 2025 Page 2 of 3

Location: Laboratory, SECOT CO., LTD.
Environment Condition: Ambient Temperature (30.8 ± 1) °C
Relative Humidity (60.9 ± 1) %
Line Voltage (222.5 ± 3) 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.
- Reference Standard Instrument :

Instrument	Model	Serial No./ID No.	Certificate No.	Due Date	Through
Digital Thermometer with sensor	34972A	MY57003188	2503175-002	2 June 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 20.0 °C
Fresh air Damper ☐ Open Position ☐
☒ Close Fan 10%
☐ Not Available

7. Result of Calibration : ☒ Without adjustment ☐ After adjustment



Calibration Report

Certificate No.: 2503897-001-01
Equipment: CHAMBER (Incubator)
Model: ICP 400 Serial No.: K406.0004
Resolution: 0.1 °C ID No.: N/A
Manufacturer: MEMMERT
Date of Calibration: 14 July 2025 Page 3 of 3

Calibration point: 20.0 °C

Calibration result:

Calibration Condition	Temperature (°C)	Relative Humidity (%)	Line Voltage (Volt)
MIN	29.6	60.3	220.0
MAX	32.3	61.5	225.0

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	20.00	20.16	20.08	20.11	20.28	20.12	20.03	20.05	20.14	0.28

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	0.14	0.15	0.53

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.: 2503897-002-01
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.: 2503897

Operation No.: 2503897-002

Date of Receipt: 14 July 2025

Date of Calibration: 14 July 2025

Calibrated by Mr.Yothin Charoensuk
 Scientist

Approved by 
 (Mr.Pheraphat Tuanjit)
 Manager, Division of Calibration Laboratory
 Responsible for the Technical Management Team

Date of Issue: 17 July 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.

F-CS-009 Revision: 01 Date: 20-04-65



Calibration Report

Certificate No.: 2503897-002-01
Equipment: Water Bath
 Model: WB 29 Serial No.: I698.0051
 Resolution: 0.1 °C ID No.: N/A
 Manufacturer: MEMMERT

Date of Calibration: 14 July 2025

Page 2 of 3

Location: Laboratory, SECOT CO., LTD.

Environment Condition:
 Ambient Temperature (31 ± 1) °C
 Relative Humidity (61 ± 1) %
 Line Voltage (228 ± 3) 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 (Re-approved-2016): 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.
- Reference Standard Instrument :

Instrument	Model	Serial No./ID No.	Certificate No.	Due Date	Through
Digital Thermometer with sensor	34972A	MY57003188	2503175-002	2-Jun-26	NATIONAL FOOD INSTITUTE
	RTD	RTD#301-305 / CH#301-305			

- 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 :
- | | |
|-------------------------------------|--------------------|
| <input checked="" type="checkbox"/> | Without adjustment |
| <input type="checkbox"/> | After adjustment |

F-CS-012 Revision: 01 Date: 20-04-65



Calibration Report

Certificate No.:	2503897-002-01		
Equipment:	Water Bath		
	Model: WB 29	Serial No.: I698.0051	
	Resolution: 0.1 °C	ID No.:	N/A
	Manufacturer: MEMMERT		
Date of Calibration:	14 July 2025		

Page 3 of 3

Calibration point: 95.0 °C
Calibration result:

Calibration Condition	Temperature (°C)	Relative Humidity (%)	Line Voltage (Volt)
Min	29.6	62	225.0
Max	32.3	60	230.0

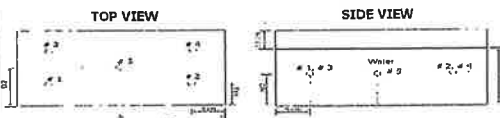


Table1 : Reporting of Temperature

Calibration Point (°C)	Measured Temperature (°C) @ Sensor No. (Sensor No.5 is REF)					Uncertainty ± (°C)
	# 1	# 2	# 3	# 4	# 5	
95.0	95.15	95.11	95.14	94.96	94.99	0.36

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	95.2	95.0	0.21	0.16	0.58

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 the test.

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

----- End -----

F-CS-012 Revision: 01 Date: 20-04-65

SECOT Co.,Ltd.
PTDS23051001

Page 1 of 57

Atomic Absorption Spectrometry


PinAAcle900T

Operational Qualification (OQ)

Company Name:	SECOT Co.,Ltd.
Address:	239 Rimkhlong Prapa Rd. Khwang Bang Sue, Khet Bang Sue, Bangkok 10800, Thailand
Location, Room:	SECOT INST-1
Serial Number or System Name:	PTDS23051001
Issue Date:	29-Apr-2025
Date Tested: Valid if tested within 1 year of Issue Date	30-Apr-2025
Recertification Period	Recommended at 12 Months
Recertification Due Date:	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 Technical Support
PerkinElmer (UK) Ltd	M/S 215
Chalfont Road	710 Bridgeport Avenue
Seer Green	Shelton
Beaconsfield	Connecticut 06484-4794
Bucks HP9 2FX	U.S.A.
United Kingdom	

PerkinElmer Technical Support
M/S 215
710 Bridgeport Avenue
Shelton
Connecticut 06484-4794
U.S.A.

Service/
Support Quality

PerkinElmer

Validation Program

Engineering

PinAAcle900T OQ Rev. G



Introduction

Objective

The objective of this document is to detail the proper operation of the PinAAcle900T. The completed qualification process demonstrates that the equipment meets the vendor-developed standards of operation and safety, and performs the functions specified by the manufacturer.

Scope and Responsibility

PerkinElmer is responsible for providing trained personnel, the OQ elements outlined in this plan and verifying that these elements are fully executed and documented.

SECOT Co.,Ltd. is responsible for accepting the terms of this plan and providing personnel and assistance to PerkinElmer for implementing the OQ outlined in this document.

Warranty Period and Service

Full details of PerkinElmer's instrument warranty have previously been provided with quotations, order acknowledgements and invoices. PerkinElmer's instrument warranty covers all parts and labor, but excludes consumable materials. Exceptions may apply to instruments purchased used.

Contact your PerkinElmer service provider for a service plan which may be purchased to extend coverage beyond warranty. PerkinElmer recommends contracting regular preventive maintenance. Over time, failure to perform the recommended preventive maintenance may reduce the reliability of some systems.

Need to Re-Qualify

The instrument may need to be qualified again following modifications made to the original configuration or if the instrument is serviced or moved

Notices

Except as specifically set forth in its terms and conditions of sale, PerkinElmer makes no warranty of any kind with regard to this document, including, but not limited to, the implied warranties of merchantability and fitness for a particular purpose.

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Acceptance Criteria

All tests must include values for acceptance criteria and the results of that test must be included.

Precision and Accuracy Measurements

The following areas of precision and accuracy will be noted on a per-test basis.

All instrument precision values (when available) will be noted within the OQ document. All data entered into the OQ document will reflect these values.

For example: If a precision value of four significant digits is supplied for a test by the manufacturer, then all four digits will be entered with the last digit being rounded down if the fifth digit is below 5, rounded up if above 5, and rounded up if fifth digit is 5.

Deviation

Deviations are events that are a departure from the specific protocol procedures as they were approved.

Deviations to the plan are permitted if those deviations are clearly detailed, approved by all parties and entered in Appendix - Deviations

Change Control

Change control procedures are in place to maintain the validation process after modifications are made to the original configuration. Any changes to the hardware, firmware or software of a validated system must be clearly specified and the validation confirmed and recorded.

1. A blank Change Control form is located in Appendix B. Consider making photocopies when blank.
2. If used, insert a completed Change Control Form and its associated data as an Attachment.

Preliminary Approval Page

Preliminary Protocol Approval

This is to certify that the Operational Qualifications procedures for the PinAAcle900T Serial number PTDS23051001 have been reviewed and both PerkinElmer and SECOT Co.,Ltd. have agreed to proceed with the procedures described in this document.

SECOT Co.,Ltd.			
Signature	Name	Title	Date (DD-MMM-YYYY)

PerkinElmer			
Signature	Name	Title	Date (DD-MMM-YYYY)

Certification: Designed and tested to be in compliance with the legal requirements for laboratory instruments. The instrument is developed and produced in compliance with ISO 9001. The WinLab32 for AA /Syngistix- AA™ Software provides required control parameters for GLP and instrument performance validation.

Temperature & Humidity: The Room Temperature should be between 15 and 35 °C (59-95 °F) with a maximum rate of change of 3 °C (5 °F) per hour. The relative humidity should be between 20 and 80%, non-condensing.

Environment: A relatively dust-free environment is necessary. This is especially important when working with ultra-trace techniques, such as graphite furnace sampling. Other important considerations are to locate the instrument in an area free of corrosive fumes and vibration and in an area that does not receive direct sunlight.

Instrument

System: The AA Flame/THGA system is a fully-integrated bench top design atomic absorption spectrometer, incorporating all spectrometer, flame atomizer and graphite furnace atomizer components in a single instrument.

Optical System

Photometer: Real-time double-beam optical system. The optics are front-surfaced, reflecting, and have a protective coating. The optical system is sealed with a protective cover.

Monochromator: Littrow design with motorized drive for automatic wavelength selection and peaking.

Wavelength Range: 190 – 900 nm.

Diffraction grating: 1800 lines/mm blazed at 236 nm and 597 nm.

Spectral Bandwidths: User selectable automatic slit widths of 0.2, 0.7 and 2.0 nm at their optimized slit height.

Detector: Wide-range segmented solid-state detector, including a built-in low-noise CMOS charge amplifier array.

Automatic Lamp Selection: 8-lamp mount with built-in power supplies for PerkinElmer® cable less Lumina™ hollow cathode and patented electrode less discharge lamps. Computer-controlled lamp selection and alignment via WinLab32 for AA/Syngistix- AA™ Software. Lamp elements and recommended operating currents are automatically recognized and set when using Lumina hollow cathode lamps and PerkinElmer EDL lamps with coding plug.

Background Correction

Deuterium Arc Lamp (flame): Built-in continuum source double-beam background correction using a high-intensity deuterium arc lamp.

Zeeman-Effect Background Correction (furnace): Longitudinal AC Zeeman-effect background correction using a modulated 0.8 Tesla magnetic field oriented longitudinal to the optical path. The magnet is automatically switched on during the atomization step only. Rollover detection is built-in.

Cooling System

Description: Self-priming re-circulating system with fan-assisted heat exchanger for constant cooling of the graphite furnace. The water temperature during operation is approximately 38 °C; the water flow is 2.5 L/min.

Power Requirements: 230V (+/-10%), 50/60 Hz (+/-1%); approx. 140 VA maximum power consumption. A means of electrically grounding the instrument and all accessories must be available.

Dimensions: 20 cm wide x 375 cm high x 50 cm deep.

Weight: 18 kg with coolant.

Certification: Designed and tested to be in compliance with the legal requirements for cooling systems.

Furnace Autosampler

Sampler Table: Installed in front of the furnace unit. Removable sample tray with 88 and 146 sampling positions for sample and reference solutions and 1 overflow container for pipette washing. Minimum sample requirement: 0.1 mL.

Dispensable Volume: Sample and Reagent: 1...99 µL, selectable in increments of 1 µL.

Electronics: The auto sampler is powered from the spectrometer and is software-controlled.

Computer & Instrument Software

Computer Requirements: WinLab32 for AA version 7.x and AA/Syngistix- AA version 1.x™ require Microsoft Windows 7 ®. Windows 7 service pack 1 is required for Syngistix installation. A computer with 2 GB RAM and a 60.0 GB or larger hard disk drive is recommended. It is also recommended to use a video display setting greater than 256 colors with a screen resolution at 800 x 600 or higher.

System Environment: Provides complete control of the instrument and its major accessories plus data handling and storage.

Data Handling: Instrument readings linear in absorbance (-0.500 A to +2.000 A), concentration or emission intensity with continuously variable scale expansion from 0.01 to 100 times. Integration times operator-selectable from 0.1 to 60 sec. in increments of 0.1 sec. Reading modes include time-averaged integration, non-averaged integration (peak area), and peak height measurement. Software includes built-in statistics. Up to fifteen (15) standards and a choice of proven calibration equations are included. Re-slope of the analytical curve using a single operator-selected calibration standard is available. There is a built-in Ethernet interface for computer connection and use of optional accessories. There is a data collection time of up to 20 minutes.

The capacity of the blower depends on the duct length and the number of elbows or bends used to install the system. If an excessively long duct system or a system with many bends is used, a stronger blower may be necessary to provide sufficient exhaust volume. Alternatively, smooth stainless steel tubing may be used instead of flexible stainless steel tubing where flexibility is not required to reduce system friction loss or "drag." A length of smooth stainless steel ducting has 20-30% less friction loss than a comparable length of flexible ducting. When smooth stainless steel tubing is used, elbows must be used to turn corners. These elbows should turn at a center line radius of 45 degrees to reduce friction losses, and the number of elbows should be minimized.

The dimensions for the various parts of the Blower and Vent Kit are shown in Figure 1. The vent i.d. is slightly larger than the tubing o.d. to allow for tubing tolerances. A slight gap between the two units is normal.

When installing such a venting system, all connections should be made with metal screws or rivets. Solder must not be used. The blower should be located at least 4 meters (12 feet) and not more than 6.5 meters (20 feet) from the flame or the graphite furnace and should exhaust to the atmosphere or into a considerably wider exhaust duct. Under these conditions, the following temperatures have been measured during operation of a nitrous oxide-acetylene flame: 310 °C at the vent intake; 160 °C at 2.4 meters (8 feet) from the vent intake; 105 °C at the blower intake; and 50 °C at the blower motor housing near the front bearing.

Instructions for installation (Part No. 09936775) are provided with the Blower and Vent assembly. The blower provided in the PerkinElmer accessory kit requires a line voltage of 115 V or 230 V, depending on which kit is purchased.

Additional recommendations on the venting system include:

- Make sure the duct casing is installed using fireproof construction. Route ducts away from sprinkler heads.
- Locate the discharge outlet as close to the blower as possible. All joints on the discharge side should be airtight, especially if toxic vapors are being carried.
- Equip the outlet end of the system with a back draft damper and take the necessary precautions to keep the exhaust outlet away from open windows or inlet vents and to extend it above the roof of the building for proper dispersal of the exhaust.
- Equip the exhaust end of the system with an exhaust stack to improve the overall efficiency of the system.
- Make sure the length of the duct that enters into the blower is a straight length at least ten times the duct diameter. An elbow entrance into the blower inlet causes a loss in efficiency.
- Design local exhaust ventilation systems individually for each specific atomic absorption instrument. Also, the opening of the exhaust vent should be large enough to cover the graphite furnace or flame area completely.
- Provide make-up air in the same quantity as is exhausted by the system. An "airtight" lab will cause an efficiency loss in the exhaust system.

• Occasionally, cylinder air may be obtained from a liquefaction process during which the oxygen-to-nitrogen ratio can change. Therefore, it is not uncommon to find other than 20% oxygen in air cylinders. This can cause erratic burner operation and non-reproducible analytical results and, in extreme cases, may provide a potential safety hazard. In general, if cylinder air is to be used, it is important to specify compressed air rather than breathing air (i.e. medical grade) or an unspecified form.

WARNING: For safe operation, oxygen must NEVER be used with PerkinElmer premix burner systems.

The use of air cylinders requires the use of a suitable dual-stage regulator. A regulator for cylinders with a CGA 590 connection is available from PerkinElmer (Part No. 03030264).

Acetylene. For the overwhelming majority of analyses, acetylene is the preferred fuel gas with atomic absorption spectrometers. Air-acetylene is the preferred flame for the determination of about 35 elements by atomic absorption. The temperature of the air-acetylene flame is approximately 2300 °C. For most air-acetylene flames, the acetylene flow used is about 4 liters/min or 0.14 cubic feet/min. Using a heat combustion value of 1,450 BTU per cubic foot, the heat given off would be approximately 12,300 BTU per hour (3,600 W). An air-acetylene flame can be used with all PerkinElmer burner heads but is most commonly used with the supplied 10-cm (4-inch) burner head (Part No. N3160134).

Suitable acetylene typically has a minimum purity specification of 99.6% with the actual assay being about 99.8%. In general, ordinary welding grade acetylene is adequate for most atomic absorption analyses, though sometimes a particular tank may be contaminated. Special higher purity "atomic absorption" grade acetylene is also available from some vendors, and its use is recommended when the available welding grade acetylene is not sufficiently pure.

A size 1A acetylene cylinder contains about 8,500 liters (300 cubic feet) of acetylene and usually lasts about 30 hours of burning time with an air-acetylene flame. The cylinder requires an acetylene pressure regulator, which can be obtained from the supplier of the acetylene or from PerkinElmer (Part No. 03030406).

CAUTION: Acetylene may react with copper to form a potentially explosive compound. Copper tubing or fittings for acetylene gas must be strictly avoided.

The PerkinElmer Acetylene Regulator Assembly includes an adapter so that the pressure regulator can be connected to cylinders requiring either CGA 300 or CGA 510 fittings and a connector for attaching the fuel hose assembly supplied with the instrument. The fuel hose assembly is constructed of red neoprene, reinforced with high tensile strength rayon cord, and provides a rated working pressure of about 1700 kPa (250 psig). The connectors are permanently mounted at each end of the hose assembly for connection to the pressure regulator and instrument gas controls, and use left-hand threads as per accepted practice for fuel gas connections. (See Section 5 for more details.)

The use of nitrous oxide requires a number of accessories and precautions. A size 1A cylinder of nitrous oxide contains about 14,800 liters (520 cubic feet) and will typically last for 10 to 12 hours of burning time. Cylinders of nitrous oxide (99.0% minimum purity) are available from local suppliers. A dual-stage regulator is recommended (and is mandatory in some countries.)

Nitrous oxide is supplied in the liquid state, initially at a pressure of about 5000 kPa (52 bar, 750 psig). Since the nitrous oxide is in a liquid form, the pressure

gauge does not give a true indication of how much nitrous oxide remains in the cylinder until the pressure starts to fall rapidly as the residual gas is drawn off.

When nitrous oxide is rapidly removed from the cylinder, the expanding gas causes cooling of the cylinder pressure regulator and the regulator diaphragm sometimes freezes. This can create erratic flame conditions or, in the most extreme case, a flashback. It is therefore advisable to heat the regulator using either a built-in heater or an externally supplied heat source, such as an electrical resistance heating tape.

CAUTION: All lines carrying nitrous oxide should be free of grease, oil or other organic material, as it is possible for spontaneous combustion to occur. Cylinders of nitrous oxide should be considered high-pressure cylinders and should be handled with care at all times.

A dual-stage heated nitrous oxide pressure regulator for use with gas cylinders with a CGA 326 connection is available from PerkinElmer [Part No. 03030204 (115 volts) or 03030349 (230 volts)]. These regulators provide pressure control from 350-520 kPa (3.4-5.2 bar, 50-75 psig) and contain an integral thermostatic heater to prevent freezing of the regulator diaphragm. A color-coded hose with suitable connectors at each end is supplied with the regulators to provide connection to the instrument gas controls.

A nitrous oxide burner head (Part No. N0400100 for the PinAAcle series of instruments) must be used with nitrous oxide-based flames. The instructions provided with the nitrous oxide burner head should be strictly followed.

Argon: Argon is required for external and internal gas streams through the THGA or HGA graphite furnace to prevent combustion of the graphite tube at temperatures above 500 degrees C. The quality criteria is listed in Table II. Normally, for graphite furnace operation, gaseous argon is used, although either liquid or gaseous argon can be used. The choice of liquid argon or gaseous argon tanks is determined primarily by the availability of each and the usage rate. Liquid argon is usually less expensive per unit volume to purchase, but cannot be stored for extended periods. If liquid argon is used, the tank should be fitted with an over-pressure regulator which will vent the tank as necessary in order to keep the liquid argon cool enough to remain in the liquid state. Gaseous argon tanks do not require venting and consequently can be stored for extended periods without loss.

A dual-stage cylinder regulator that can be used with either gaseous argon or nitrogen is available from PerkinElmer (Part No. 03030284). The regulator has a CGA 580 fitting, and includes a color-coded hose with 1/4-inch Swagelok® fittings to permit direct connection to the regulator and to the instrument gas controls.

- Use galvanized iron tubing, steel, wrought iron or other tubing that will not react chemically with acetylene. Never use copper tubing with acetylene. Joints may be welded or made up of threaded or flanged fittings, typically stainless steel, aluminum or brass composed of less than 65% copper. Rolled, forged or cast steel or malleable iron fittings may also be used. Cast iron fittings cannot be used safely for acetylene lines.

- Arrange gas hoses where they will not be damaged or stepped on and where things will not be dropped on them.

- Never run acetylene at a pressure higher than 100 kPa (15 psig). At pressures above this level, acetylene may spontaneously explode.

- Perform periodic gas leak tests by applying a soap solution to all joints and seals.

WARNING: Contact between acetylene gas and copper or silver (or high concentrations of silver salts), liquid mercury or gaseous chlorine can produce potentially unstable acetylides. Always clean the burner thoroughly after analyzing solutions with high silver or mercury concentrations, and aspirate solution continuously during the analysis to prevent any residues from drying.

- Periodically check for the presence of acetylene in the laboratory atmosphere, especially near the ceiling.

- When the equipment is turned off (for example, at the end of the working day), close all gas cylinder valves tightly at the tank. Bleed the remainder of the line to the atmosphere before the exhaust fan (vent) is turned off.

- When using premix burners with cyanide solutions, check the pH of the liquid trap and drain vessel. The pH of the liquid should be greater than 10. If the liquid is even slightly acidic, highly toxic hydrogen cyanide gas may be released.

- Take suitable precautions when using volatile organic solvents. A potentially flammable organic vapor "cloud" can form around the opening of the sample vessel. Feeding the capillary tubing through a small hole in a covered sample container is one way of reducing the possibility for ignition.

- Never view the flame, hollow cathode lamps, electrode less discharge lamps or deuterium background corrector lamps directly without protective eyewear. Potentially hazardous ultraviolet radiation may be emitted. Ordinary safety glasses will in general provide sufficient protection, but additional side shields will ensure a further margin of safety. Safety glasses will also provide mechanical protection for the eyes.

- Never leave the flame unattended.

- Zeeman background-corrected AA instruments generate a strong magnetic field. People with cardiac pacemakers are advised not to operate or frequent the vicinity of Zeeman-corrected instruments while they are in operation.

Drain Vessels: A specially-configured drain vessel is supplied with all PerkinElmer atomic spectroscopy instruments with burner systems. That vessel must be used to gather the effluent from the AA burner drain.

The THGA furnace and Zeeman magnet of the PinAAcle 900T system operates from a single, dedicated electrical supply of 230 volts ($\pm 10\%$), under full instrument load, 30 amp, 50 or 60 Hz (± 0.3 Hz), single phase, capable of delivering 10.1 KVA. The PinAAcle 900T system is provided with a 30-amp plug. It is recommended that 8-gauge (6 mm²) wire be used for the electrical supply for the PinAAcle 900T system, and that the length of the wiring (circuit breaker to instrument connection) not exceed 20 meters (65 feet). If the length of the wiring exceeds 20 meters, 6 gauge wiring is needed.

For all furnace systems, the electrical supply should contain a "slow blow" circuit breaker capable of handling 300% of the rated current for periods of 3 seconds. Also, the AA spectrometer, graphite furnace, Zeeman magnet, computer and other accessories should all be connected to the same electrical ground. There should be no more than 10 volts peak to peak noise between hot and neutral and no more than 0.5 volts noise between neutral and ground. If noise exceeds either or both values, a line conditioner is needed.

Additional Furnace Requirements:

A water supply is required to cool the furnace quickly to ambient temperature after reaching high atomization temperatures. A suitable recirculating cooling system is included with the PinAAcle 900T.

When operating the HGA Graphite Furnace systems at high temperatures, do not look directly at the tube without suitable eye protection.

1.4 Maintenance and Troubleshooting

Routine maintenance can be performed by a trained analyst using the instructions found in the respective documents for maintenance and troubleshooting. PerkinElmer has trained service representatives, who perform other planned maintenance service annually or as required. Departmental Standard Operating Procedures (SOPs) shall also be consulted to implement and document the necessary repairs.

1.5 Hazards and Safety Precautions

Refer to respective documents for the safety summary outlines and explanation.

3 Operational Qualification Test Description

Configurations Covered	PinAAcle900T	
Accessories/Components not covered	Model	Serial Number
Estimated Certificate Testing Time		
Pre-test Stabilization	1.0 Hour	
Testing Time	7.0 Hours	
Materials Required		
Documentation	Part Number	
Service Manual	09936989	
Hardware Manual	09936985 or 09931148	
PinAAcle Family Preparing Your Laboratory for PerkinElmer Atomic Absorption Spectrometers	009362_03	
Analytical Methods for AAS Manual	03030152 (FlmCkbbk)	
Safety with Organic Solvents	B0190413	
Recommended Single-Element Conditions for THGA Furnaces	09935220	
AS-900 User's Manual	09936997 or 09931157	
Cooling System User's Guide	09935299 (Coolsys-1)	
Automatic Matrix Modification for THGA Graphite Furnace AA	D-6124	
OQ Certification Sticker	09934513	
Comments:		
PerkinElmer Representative Signature:	Date: (DD-MMM-YYYY)	
Customer Representative Signature:	Date: (DD-MMM-YYYY)	

All solutions prepared at customer site must be labeled in accordance with the customer requirements	
Tests	
Name of Test	Description
Detector Linearity with Barium	Ensures that the detector is linear in the Visible Range
Baseline Noise at 1.0 Absorbance with Barium	Ensures that a high absorbance will not produce excessive noise.
AA Baseline with Copper	Checking baseline noise.
D ₂ Background Compensation, Copper	Verifies the instruments ability to compensate for Background absorption
AA-BG Baseline Noise with Copper	Ensures that background correction does not produce excessive noise.
AA-BG Baseline Noise with Arsenic	Ensures that background correction does not produce excessive noise at a low wavelength.
Flame safety checks	Checks to ensure that all safety interlocks are closed
Standard flame check	Checks for a moderately blue flame
Flame interlock shutdown	Checks that the flame extinguishes safely
Nitrous Oxide flame check (if applicable)	Checks that the Nitrous Oxide / Acetylene flame ignites and extinguishes correctly
Flame Sensitivity and Precision	Instrument sensitivity and reproducibility checked against Copper standard.
Furnace Gas Flows	Ensures the flow rates are within specification
Chromium Baseline Noise	Signal to noise check
Chromium Characteristic Mass and Precision	Calculate the characteristic mass using characteristic mass tool and precision from the integrated absorbance values
Copper Characteristic Mass and Zeeman Ratio	Calculate the characteristic mass using the characteristic mass tool. Check the Zeeman Ratio
Autosampler Linearity	Checks the Correlation Coefficient
PerkinElmer assumes no responsibility for failure of test results except as covered by instrument warranty or contract.	

4.1.2 Test Prerequisites

- Burner Head below the light beam.

4.1.3 Test Steps

- Open the **Det Linearity** (WinLab32), or **PFHT-Detector Lin-Ba** (Syngistix) method in the Service PinAAcle directory. If there is an interlock message concerning the burner head, and/or nitrous oxide, change the oxidant to air in the burner control window.
- Open Continuous Graphics.
- Autozero
- Place the 2.0 A Neutral Density Filter in the Filter holder in the Sample Compartment. Record the Absorbance in the table below. Remove the filter from the filter holder.
- Repeat with the 1.0 A Neutral Density Filter.
- Repeat with the 0.2 A Neutral Density Filter.
- Remove the filter from the filter holder
- Close Continuous Graphics
- Record the test results, and/or print to file.
- If desired, Manual Analysis can be used, so data can be saved, but a blank may need to be added to the service method.

4.1.4 Test Results

Parameter	Specification	Calibrated Filter Absorbance at 553.6	Test Result	Pass/Fail
Absorbance of "2.0 Filter"	± 10% from Calibrated Filter Value			
Absorbance of "1.0 Filter"	± 10% from Calibrated Filter Value			
Absorbance of "0.2 Filter"	± 10% from Calibrated Filter Value			
Comments:				
PerkinElmer Representative Signature:			Date: (DD-MMM-YYYY)	
Customer Representative Signature:			Date: (DD-MMM-YYYY)	

4.3 AA Baseline with Copper

4.3.1 Test Conditions

- Install the Copper Lamp.
- If the lamp is not coded, enter the element in the Lamp Setup window.
- Turn on the Copper lamp and select Setup for the Copper lamp.
- Close the Lamp Setup Window.

4.3.2 Test Prerequisites

- Burner Head below the light beam.

4.3.3 Test Steps

- Open the **AA BL Noise** (WinLab), and **PFHT- AA BL Noise- Cu** (Syngistix) method in the Service PinAAcle directory.
- In the (Manual) Analysis window, select Analyze Sample for 99 replicates to be measured, using a 0.5 second integration time.
- Record the results in the table below.
- Print the test results if desired.

4.3.4 Test Results

Parameter	Specification	Test Result	Pass/Fail
Standard Deviation	≤ 0.001		
Comments:			
PerkinElmer Representative Signature:		Date: (DD-MMM-YYYY)	
Customer Representative Signature:		Date: (DD-MMM-YYYY)	

4.5 AA-BG Baseline Noise with Copper

4.5.1 Test Conditions

- Install the Copper Lamp.
- If the lamp is not coded, enter the element in the Lamp Setup window.
- Turn on the Copper lamp and select Setup for the Copper lamp.
- Close the Lamp Setup window.

4.5.2 Test Prerequisites

- Burner Head below the light beam.

4.5.3 Test Steps

- Open the **AA-BG BL Noise** (WinLab), **PFHT AA-BG BL Noise Cu** (Syngistix) method in the Service PinAAcle directory.
- In the (Manual) Analysis window, click on *Analyze Sample*, 99 replicates will be measured, with an integration time of 2.0 seconds.
- Record the results in the table below.
- Print the test results if desired.

4.5.4 Test Results

Parameter	Specification	Test Result	Pass/Fail
Standard Deviation	≤ 0.005		
Comments:			
PerkinElmer Representative Signature:		Date: (DD-MMM-YYYY)	
Customer Representative Signature:		Date: (DD-MMM-YYYY)	

4.7 Flame Safety Checks

4.7.1 Test Conditions

- Before igniting the flame, make sure the following conditions are satisfied.
- Make sure the vent is on and has the correct flow rate as specified in the Preparing Your Laboratory for AA document.
- Ensure the spray chamber is correctly installed.
- Ensure the end cap is secured by the latches.
- Ensure the burner head is correctly installed.
- Ensure that the correct sample introduction O-rings are installed, they are compatible with the solutions being run, and they are in good condition.
- Make sure the stainless steel nebulizer (if applicable), has an outer O-ring and the end cap retainer is over the nebulizer flange.
- Ensure the fuel and oxidant hoses are correctly fitted to the instrument.
- Ensure the drain system is installed and is operating correctly.
- Make sure the drain system is out in the open (not in a cabinet).
- Ensure the flame atomizer door is in the closed position.
- Ensure all safety interlocks are satisfied.
- Ensure Cyanide solutions, which produce a poisonous gas when mixed with acidic solutions, are not present in the drain bottle.

If the interlocks are not closed, one or more of the following may be the cause:

- The burner head, the nebulizer, or the drain system is not correctly installed.
- The acetylene or oxidant pressure is too low.
- There is not enough liquid in the drain trap/loop.
- The liquid level in the drain vessel is too high.

4.7.2 Test Steps

- Document the above conditions in the check box below.

4.7.3 Test Results

Parameter	Specification	Test Result	Pass/Fail
Flame Safety Check	Items specified above were checked		
Flame Safety Check	Interlocks are correctly closed		
Comments:			
PerkinElmer Representative Signature:		Date: (DD-MMM-YYYY)	
Customer Representative Signature:		Date: (DD-MMM-YYYY)	

4.9 Flame Interlock Check

4.9.1 Test Conditions

- Install the Copper Lamp.
- If the lamp is not coded, enter the element in the Lamp Setup window.
- Turn on the Copper lamp and select Setup for the Copper lamp.
- Flame on.

4.9.2 Test Prerequisites

- The flame safety checks passed.

4.9.3 Test Steps

- Cover the flame sensor with a very long screwdriver with a wide blade, or other appropriate tool. Make sure the flame extinguishes safely. You will see a flame interlock error message.
- Re-ignite the flame and unplug the drain sensor cable. Make sure the flame extinguishes safely. **WinLab32:** The Safety Interlock "X" will turn red in the Flame Control Window. A drain not connected pop-up error message will appear. **Syngistix:** You will see a drain not connected error message in the flame control window, and a drain not connected pop-up error message.
- Re-connect the drain sensor cable.
- Re-ignite the flame and carefully rotate the nebulizer side arm counterclockwise. Make sure the flame extinguishes safely. **WinLab32:** The Safety Interlock "X" will turn red in the Flame Control Window. A Nebulizer missing pop-up error message will appear. **Syngistix:** You will see a nebulizer missing error message in the flame control window and a nebulizer missing pop up message.
- Re-position the nebulizer correctly.
- Re-ignite the flame. If accessible, turn off the acetylene valve. Make sure the flame extinguishes in a safe manner. **WinLab32:** The Safety Interlock "X" will turn red in the Flame Control Window. A no fuel pressure pop-up error message will appear. **Syngistix:** You will see a no fuel pressure error message in the flame window and a no fuel pressure pop up message.
- Turn the acetylene back on.
- Re-ignite the flame. If accessible, turn off the air pressure valve. Make sure the flame extinguishes in a safe manner. **WinLab32:** The Safety Interlock "X" will turn red in the Flame Control Window. A no air pressure pop-up error message will appear. **Syngistix:** You will see a no air pressure interlock in the flame control window and a no air pressure pop up message.
- Turn the air back on.

4.10 Nitrous Oxide Flame Check (if applicable)

4.10.1 Test Conditions

- Install the Copper Lamp.
- If the lamp is not coded, enter the element in the Lamp Setup window.
- Turn on the Copper lamp and select Setup for the Copper lamp.
- Close the Lamp Setup Window.
- Nitrous oxide burner head installed (make sure standard burner head is cool before removing).
- Nitrous gas line is installed between the instrument and a tank that has a pressure above 500 psi (3447 kilopascal or 34.5 bar). The tank is empty if the pressure is below 500 psi (3447 kilopascal or 34.5 bar).
- A heated nitrous oxide regulator is installed on the nitrous oxide tank.
- The nitrous oxide regulator line pressure is set to the correct pressure according to the installation procedure.
- Ensure the vent flow is between 250 and 300 CFM.

4.10.2 Test Prerequisites

- All safety interlocks have been checked.
- A copper method such as the FL Sens&Prec(HS or SS) or PFHT-FI Sen Pred-Cu method is open.

4.10.3 Test Steps

- In the Flame Control window click on the N₂O radio button.
- Switch on the flame by clicking on the Flame On button. A standard flame will be ignited and after a short moment the changeover to Nitrous Oxide will take place.
- Make sure the Nitrous Flame is not too lean (all blue) and not too rich (all white). There should be a pink feather that is 2-5 cm high.
- Select the flame off button. Make sure the Nitrous Oxide Flame extinguishes safely.
- Re-ignite the flame. If accessible, turn off the acetylene valve. Make sure the flame extinguishes in a safe manner.
- Re-ignite the flame. If accessible, turn off the nitrous oxide valve. Make sure the flame extinguishes in a safe manner.
- Check the appropriate Test Result box for each of the tests.

4.11 Flame Sensitivity and Precision

4.11.1 Test Conditions

- Install the Copper Lamp.
- If the lamp is not coded, enter the element in the Lamp Setup window.
- Turn on the Copper lamp and select Setup for the Copper lamp.
- Close the Lamp Setup Window.

4.11.2 Test Prerequisites

- For the Stainless Steel Nebulizer: Accurately pipette 10 ml of the GFAAS-MIXED STANDARD (part number N930 0244) into an acid-washed 100 ml class A volumetric flask and dilute to volume with deionized water or the 1% Nitric Acid solution. The diluted solution contains 5.0 mg/L copper. A clean plastic 125 mL bottle can also be used if the standard is made up by weight using a transfer pipet.
- For the Plastic Nebulizer: Accurately pipette 4 ml of the GFAAS-MIXED STANDARD (part number N930 0244) into an acid-washed 100 ml class A volumetric flask and dilute to volume with deionized water or the 1% Nitric Acid solution. The diluted solution contains 2.0 mg/L copper. A clean plastic 125 mL bottle can also be used if the standard is made up by weight using a transfer pipet.
- Ensure the burner head is parallel to the light beam (not tipped).
- Open the Continuous Graphics and flame control windows.
- Ensure the burner head is below the beam from the lamp, and autozero.
- With the flame off, optimize the burner height.
- With the flame on, while aspirating the appropriate standard for the nebulizer being used, align the horizontal and rotational positions.
- Now optimize the nebulizer. Unlock the nebulizer locking nut. Slowly turn the nebulizer adjustment nut counterclockwise until you see bubbles in the copper solution or until the absorbance goes to zero. Turn the nebulizer adjustment nut clockwise until the absorbance goes to its maximum. The minimum absorbance is listed in the table below.
- Optimize gas flows to obtain the highest absorbance.
- Close the Continuous Graphics window.

4.11.3 Test Steps

- Open the FL Sens&Prec(HS or SS) or PFHT-FI Sen Pred-Cu method. Change the gas flows to the values that gave the highest absorbance during optimization. Define the Blank in the method if needed.
- Open the Manual Analysis and Result windows.

4.12 Furnace Gas Flows

4.12.1 Test Conditions

- Open the furnace base module.

4.12.2 Test Steps

- Turn on the gas flow, standard flow, not mini flow.
- Open the graphite furnace and remove the graphite tube.
- Insert the test jig (B0505495) into the rear contact cylinder.
- Connect the gas outlet of the jig to a flow meter.
- Measure the flow rate for front and back (internal) and record the values.
- Determine the difference in flow rate between the two sides for the internal flows.
- Remove the test jig and put the graphite tube back into the furnace.
- Check the external flow rates by connecting the flow meter to the external hoses at the QCM connectors and record the values for both sides.
- Determine the difference in flow rate between the two sides for the external flows.
- Adjust the regulator if needed to either increase all flow rates or to decrease all flow rates.
- Check hose connections for any leaks. Make sure the gas lines seal in the connector.
- Close the base module.

4.13 Chromium Baseline Noise (Furnace)

4.13.1 Test Conditions

- Install the Chromium Lamp.
- If the lamp is not coded, enter the element in the Lamp Setup window.
- Turn on the Chromium lamp and select Setup for the Chromium lamp.
- Close the Lamp Setup Window.
- Make sure a **standard THGA tube** is in the furnace. In the *Furnace Control* window click on the **Condition Tube** button to condition and clean the THGA tube.
- Use the 88 position sample tray of the AS-900, check the tray configuration.
- Align the AS-900 carefully, as described in the Hardware Manual.
- Immerse the rinse liquid capillary into a bottle of **Isopropanol**.
- In the *Furnace Control* window click at least 5 times on the **Flush Sampler** button to remove dirt and oils from the pump and capillary system of the AS-900.
- Connect the rinse liquid capillary back into the rinse liquid vessel.
- In the *Furnace Control* window click at least 5 times on the **Flush Sampler** button to remove any Isopropanol from the pump and capillary system of the AS-900. Repeat this step if necessary to remove all air bubbles.

4.13.2 Test Steps

- Open the **THGA Cr Tests** (WinLab), **PZT- BL Char Mass- Cr** (Syngistix) method.
- From the *Tools* (WinLab) or *Analysis & Results* (Syngistix) choices, open the following windows; *Results*, *(Transient) Peaks (Display)* and *(Automated) Analysis (Control)*.
- Before starting the test, run at least one **dry firing** (without any sample) to make sure that there is **no residual signal (less than 0.005 integrated absorbance, which is peak area)** from any previous injections or tube contamination.
- Repeat the dry firing as needed to ensure there is no peak from contamination.
- It is also recommended to inject the blank at least once to make sure all contamination is removed from the sampling capillary and to ensure that the blank solution is clean.
- Change *All Defined to Locations* and type in 3 (empty), as the sample location in the *Analysis* window. Click on the **Analyze Samples** button to measure **5 furnace dry firings** (without any sample).
- Record the results in the table below.
- Print the test results if desired.

4.14.3 Test Steps

- Use the same method as the previous test.
- Rinse a clean, dry, sample cup 3 times with the standard solution, fill the cup with the standard solution and place it in position 2 of the sample tray.
- Rinse a clean, dry sample cup 3 times with deionized water, fill the cup with deionized water and place it in position 1 of the sample tray.
- Inject the blank (position 1) using "Select Loc" on the *Analyze/Analysis* page at least once to make sure all contamination is removed from the sampling capillary and to ensure that the blank solution is clean.
- Change *All Defined to Locations* and type in 2 as the sample location in the *Analysis* window, click on the **Analyze Samples** button to measure five 20 uL injections of the Cr standard.
- Calculate the characteristic mass using the *Characteristic Mass* tool from the *Analyses* pull down menu.
- The characteristic mass (m_0) results in picograms, is calculated from the mean integrated absorbance (peak area) values and should not exceed the value listed in the following table.
- **NOTE:** If the characteristic mass is exceptionally low, check for possible contamination of the water, acid, volumetric flask and sample container used for sample preparation. Prepare a new solution if needed.
- The relative standard deviation (%RSD) of the mean sample solution readings, calculated from the integrated absorbance (peak area) values for Cr must not exceed the **maximum value of 2.0%**.
- Record the characteristic mass and precision results in the table below.
- Print the test results if desired.

4.14.4 Test Results

Parameter	Specification	Test Result	Pass/Fail
Chromium Characteristic Mass	≤ 7.0		
Chromium Precision (RSD)	$\leq 2.0 \%$		
Comments:			
PerkinElmer Representative Signature:		Date: (DD-MMM-YYYY)	
Customer Representative Signature:		Date: (DD-MMM-YYYY)	

- The Zeeman Ratio, R, results calculated from the integrated absorbance (peak area) values should lie within the ranges for Cu listed in the table below.
- Record the results for Zeeman ratio in the table below.
- Print the test results if desired.

4.15.4 Test Results

Parameter	Specification	Test Result	Pass/Fail
Copper Characteristic Mass	≤ 17		
Cu Zeeman Ratio	0.52 ± 0.04		
Comments:			
PerkinElmer Representative Signature:		Date: (DD-MMM-YYYY)	
Customer Representative Signature:		Date: (DD-MMM-YYYY)	

4.16 Autosampler Linearity (Furnace)

4.16.1 Test Conditions

- Install the Chromium Lamp.
- If the lamp is not coded, enter the element in the Lamp Setup window.
- Turn on the Chromium lamp and select Setup for the Chromium lamp.
- Close the Lamp Setup Window.

4.16.2 Test Prerequisites

- Perform flushes with isopropanol. Remove the isopropanol by flushing with the normal rinse solution.

4.16.3 Test Steps

- Open the THGA AS-900 Lin (WinLab), PZT – AS900 Linearity- Cr (Syngistix) method.
- From the Tools (WinLab) or Analysis & Results (Syngistix) choices, open the windows; Results, (Transient) Peaks (Display), Calibration (Display) and (Automated) Analysis.
- Click on the Analysis window and then on the Calibrate button to start the calibration.

Final Approval Page

Final Protocol Approval

This is to certify that the Operational Qualifications procedures for the PinAAcle900T Serial number PTDS23051001 have been performed and the configuration installed meets [] does not meet [] the procedures and specifications described in this document.

SECOT Co.,Ltd.			
Signature	Name	Title	Date (DD-MMM-YYYY)
PerkinElmer			
Signature	Name	Title	Date (DD-MMM-YYYY)

Appendices

Appendix B – Change Control

Note: Create copies of this page, leaving original blank. Read instructions below.

Change Control procedures maintain the validation process after modifications are made to the original configuration (by OEM, SECOT Co.,Ltd., or PerkinElmer). The Change Control Form is located in Appendix B – Change Control and instructions are located in the Introduction. Insert the completed Change Control Form and its data into this validation document as an Attachment.

Change Control Revision Attachment #: __

Component / Software Changed

Reasoning and Justification for Change

Verification of New Component / Software

Acceptance Criteria Used

Results of Verification (Attach original data)

Validation Results

Validation	Pass/Fail
Signature	Date (DD-MMM-YYYY)
Performed By:	
Approved By:	

Appendix D – Document History

Revision	Description of Change	Page(s)	Date
A	First release	-	April 2012
B	Made lamp warm up time recommended. Changed copper to chromium or chromium to copper to correct error.	28	January 2015
	Changed how Nitrous Oxide/Acetylene is checked	39-41	
	Revised documentation list	25	
	Added a choice of using 1% and 0.5% Nitric Acid solutions instead of deionized water	26, 41, 42, 47	
	Added the option of using a plastic bottle and scale to make up the standard solutions	26, 42, 47	
	Changed copper to chromium (to correct error)	50	
	Changed computer specification	13	
	Changed parameter testing preparation	28	
	Added column for calibrated filter absorbance	29	
	Changed filter specification to $\pm 10\%$ to correspond to the specification on previous instruments	29	
	Corrected specification on test # 3	31	
	Added: option of printing results	29-50	
	Added: nebulizer O-ring compatibility statement	35	
	Added: make sure the drain bottle is out in the open	35	

C	Changed flame nebulizer precision to $\leq 0.5\%$ RSD, since the previous specification was for a new system.	40	July 2015
	Changed the furnace characteristic mass to a maximum value instead of a range.	45- 47	
D	Changed calibration due date to calibration date	24	August 2016
E	Corrected error – characteristic mass should be a maximum value for copper	47	December 2018
F	Addition of the 0.7A Neutral Density Filter to the Material List.	24	December 2021
	Change the Cu D2 Compensation test criteria to use the 0.7A Neutral Density Filter instead of the 1.0A filter.	30	
G	Corrected Test Steps Section 4.12 sequence for Furnace Gas Flows	41	August 2023

Certificate of System Qualification

ES-OQ

System ID: MY16230003
Organization Name: SECOT Co.,Ltd
Organization Location: 239 Rimklongprapa Rd., Kwaeng Bang Khet Bang Sue Bangkok 10800 Thailand

Date: April 30, 2025 1:39:20 PM
EQP Name: AgilentRecommended
EQP Revision: ES.02.50
Overall Qualification Status: Pass

Preparation

Pass

Instrument Tests

Pass

Autosampler Operation

Pass

Date: April 30, 2025 1:39:20 PM
System ID: MY16230003

Instrument Details

Purpose

This section describes the as found system configuration.

Details

Spectrometer 1

Manufacturer: Agilent Technologies
Name: 5110 VDV
Model Number: G8015AA
Sample Introduction: Double pass glass cyclonic spraychamber and seaspray nebulizer
Serial Number: MY16230003
Firmware Revision: 3354

Chiller 1

Manufacturer: Agilent Technologies
Name: Chiller
Model Number: G8481A
Serial Number: 3B1641345

Autosampler 1

Manufacturer: Agilent Technologies
Name: SPS4
Model Number: G8410A
Serial Number: AU16181341

Date: April 30, 2025 1:39:20 PM
System ID: MY16230003

Electronic Signature

Purpose

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Logged On User Name:	suwan.onkhom@non.agilent.com
Signature Creation Date:	April 30, 2025
Reason for Signature:	Executed protocol and published this original version of document

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Report Generated by Hostname: LAPTOP-V6TKMFFH

System ID: 00116230003
Print Date: April 30, 2025 1:39:21 PM

PMOQ_IO_SECOT_6007731081_2025430 Transaction log :

Time	Transaction State	Activity Performed	Type of Transaction	Optional Information
April 30, 2025 11:54:15 AM	Audit	SessionCreated	Session	None
April 30, 2025 11:54:15 AM	Start	Configuration	Session	None
April 30, 2025 11:54:15 AM	Audit	Entitlement	Licensing	User is Nonpaying and does not require an unlock code
April 30, 2025 12:02:13 PM	Audit	EqpLoaded	Session	EQP details for primary technique [Es] - File path: [ProtocolPacks/Es/Configurations/02.50/Es.02.50_eqp], EQP File Name: [Es.02.50_eqp], EQP Name: [AgilentRecommended], Protocol Revision :[Es.02.50]
April 30, 2025 12:02:19 PM	End	Configuration	Session	None
April 30, 2025 12:02:23 PM	Start	Qualification	Session	PM
April 30, 2025 12:02:23 PM	Start	Qualification	Session	OQ
April 30, 2025 12:02:23 PM	Start	Execution	ES System Inspection : 5110 VDV, Chiller 1 - G8481A: ES System Inspection	None
April 30, 2025 12:02:40 PM	End	Execution	ES System Inspection : 5110 VDV, Chiller 1 - G8481A: ES System Inspection	Run Count : 1
April 30, 2025 12:02:43 PM	Start	Execution	Spectrometer Maintenance : 5110 VDV, Chiller 1 - G8481A: Spectrometer Maintenance	None
April 30, 2025 12:56:32 PM	End	Execution	Spectrometer Maintenance : 5110 VDV, Chiller 1 - G8481A: Spectrometer Maintenance	Run Count : 1
April 30, 2025 12:58:49 PM	Start	Execution	Autosampler Maintenance : Autosampler 1 - SPS4: Autosampler Maintenance	None

Total Number of Transactions:

Report Generated by Hostname: LAPTOP-V6TKMFFH

System ID: MY16230003

Print Date: April 30, 2025 1:59:21 PM

PMOQ_IO_SECOT_6007731081_2025430 Transaction log:

Time	Transaction State	Activity Performed	Type of Transaction	Optional Information
April 30, 2025 12:56:57 PM	End	Execution	Autosampler Maintenance : Autosampler 1 - SPS4: Autosampler Maintenance	Run Count : 1
April 30, 2025 12:57:01 PM	Start	Execution	ES Service Review : 5110 VDV, None Chiller 1 - G8481A: ES Service Review	
April 30, 2025 12:58:07 PM	End	Execution	ES Service Review : 5110 VDV, None Chiller 1 - G8481A: ES Service Review	Run Count : 1
April 30, 2025 12:58:10 PM	End	Qualification	Session	PM
April 30, 2025 12:59:10 PM	Start	Qualification	Session	OQ
April 30, 2025 12:59:10 PM	Start	Execution	Preparation : 5110 VDV: Qualitative Test - No setpoints associated	None
April 30, 2025 1:11:02 PM	End	Execution	Preparation : 5110 VDV: Qualitative Test - No setpoints associated	Run Count : 1
April 30, 2025 1:11:05 PM	Start	Execution	Instrument Tests : 5110 VDV: Qualitative Test - No setpoints associated	None
April 30, 2025 1:11:35 PM	End	Execution	Instrument Tests : 5110 VDV: Qualitative Test - No setpoints associated	Run Count : 1
April 30, 2025 1:11:38 PM	Start	Execution	Autosampler Operation : Autosampler 1 - SPS4: Qualitative Test - No setpoints associated	None
April 30, 2025 1:11:49 PM	End	Execution	Autosampler Operation : Autosampler 1 - SPS4: Qualitative Test - No setpoints associated	Run Count : 1
April 30, 2025 1:11:52 PM	End	Qualification	Session	OQ

Page 2 / 3

Total Number of Transactions:

Report Generated by Hostname: LAPTOP-V6TKMFFH

System ID: MY16230003

Print Date: April 30, 2025 1:59:21 PM

PMOQ_IO_SECOT_6007731081_2025430 Transaction log:

Time	Transaction State	Activity Performed	Type of Transaction	Optional Information
April 30, 2025 1:11:52 PM	Start	Reporting	Session	None
April 30, 2025 1:20:38 PM	Audit	Reporting	Session	Report Generated : Report
April 30, 2025 1:21:53 PM	Audit	Reporting	Session	Report Signed : Report PDF Name: PMOQ_IO_SECOT_6007731081_2025430_20250430_PM Report_1.pdf User Name: suwan.onkhom@non.agilent.com Full Name of Signer: Suwan Onkhom Reason for signature: Executed protocol and published this original version of document
April 30, 2025 1:38:15 PM	Audit	Reporting	Session	Report Generated : Certificate
April 30, 2025 1:38:34 PM	Audit	Reporting	Session	Report Generated : Report

Page 3 / 3

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

Hz

1.44

Agilent Recommended: <= 3.00

Status: Pass

Drift

Hz/h

4.73

<= 15.00

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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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

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User Name: nattapat.hengcharoen@agilent.com
System ID: CN15343147

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: 2A964E77
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/Configural 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 seipoints associated	None
April 28, 2025 12:18:17 PM	End	Execution	System Inspection and Basic Safety and Operation - 7890: - Qualitative Test - No seipoints associated	Run Count : 1

User Name : natipol.hangolai@ccn
System ID : CN15343147

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 : natipol.hangolai@ccn
System ID : CN15343147

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: nadapatti.kingthorsonSystem 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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User Name: nadapatti.kingthorsonSystem 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 12:28:02 PM	start	Execution	GC Scouting Run - Injection Tower, Front SSL, Back FID: - Part of System Preparation - No limits associated	None

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User Name: jls@jls.com System ID: CN15343147
File Path: D:\Secot_ECD\IOQ 2025-04-24 15-01-00\IP_FID_1.D\FID2B.ch

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 12:32:18 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\IND_B_01.D\FID2B.ch

User Name: jls@jls.com System ID: CN15343147
File Path: D:\Secot_ECD\IOQ 2025-04-24 15-01-00\IP_FID_2.D\FID2B.ch

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: admin@agilent.com 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\ISC_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

User Name: admin@agilent.com 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\ND_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\SN_ECD_1.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 12:56:16 PM	Audit	Reporting	Session	Report Generated : Certificate
April 28, 2025 12:56:43 PM	Audit	Reporting	Session	Report Generated : Report

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

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 login 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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Report Generated by Host Name: DESKTOP-ST5F4N3
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 9:48:38 AM	Audit	SessionCreated	Session	Host Name: DESKTOP-ST5F4N3, Drive Serial Number: E842594E
April 10, 2025 9:49:38 AM	start	Configuration	Session	None
April 10, 2025 9:49:38 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.aqp], EQP File Name: [GcMs.02.56.aqp], 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

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Report Generated by username: DESKTOP5TGF6KX
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 9:56:10 AM	start	Execution	System Inspection and Basic Safety and Operation - 8890: - Qualitative Test - No setpoints associated	None
April 10, 2025 9:56:25 AM	End	Execution	System Inspection and Basic Safety and Operation - 8890: - Qualitative Test - No setpoints associated	Run Count : 1
April 10, 2025 9:56:27 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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Report Generated by username: DESKTOP5TGF6KX
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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Report Generated by Host Name: DESKTOP-ST5F4N3

Print Date: April 10, 2025 3:59:00 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	
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 11:19:09 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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Report Generated by Host Name: DESKTOP-ST5F4N3

Print Date: April 10, 2025 3:59:00 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	AccClosed	Session	None
April 10, 2025 12:15:07 PM	Audit	AccRestarted	Session	Host Name: DESKTOP-ST5F4N3, Drive Serial Number: EB42594E
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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View Report in the Report Repository

Report Generated by Host Name: DESKTOP-ST5F4N3

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 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\UQOQ2025\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: E642594E
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 3:06:27 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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View Report in the Report Repository

Report Generated by Host Name: DESKTOP-ST5F4N3

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 3:15:42 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 3:19:37 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 3:19:39 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	None
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	None
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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Host Name: nattapat.hengcharoen
Report Generated by Hostname: DESKTOP-ST5F4N3

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 3:48:12 PM	Audit	Reporting	Session	Report Generated : Certificate
April 10, 2025 3:48:29 PM	Audit	Reporting	Session	Report Generated : Report

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Host Name: nattapat.hengcharoen
Report Generated by Hostname: DESKTOP-ST5F4N3

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: nattapat.hengcharoen@agilent.com Full Name of Signer: Nattapat 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: nattapat.hengcharoen@agilent.com Full Name of Signer: Nattapat Hengcharoen Reason for signature: Executed protocol and published this original version of document
April 10, 2025 3:49:28 PM	Audit	AceClosed	Session	None
April 10, 2025 3:50:07 PM	Audit	AceRestarted	Session	Host Name: DESKTOP-ST5F4N3, Drive Serial Number: E842594E
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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Here Name: User: User Name
Report Generated by: Username: DESKTOP-EST54N2
Print Date: April 10, 2025 3:58:31 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

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Agilent CrossLab Start Up Services

Agilent 7890 Gas Chromatograph

Preventive Maintenance Checklist

Agilent Preventive Maintenance provides factory recommended service for your analytical instruments to assure 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	n	n
AUX detector output	//	n
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 6007478104 Date service completed 13 Feb 2025
 Agilent signature Syn N. Customer signature Jutarat Jaemrueh
 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. | G3172A | 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 type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Pump system back down. Wait until system stability has been achieved.	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Verify system vacuum reading(s) via the gauge controller.	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Leak Check	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		Verify system in manual tune
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		Compare against previous tune file report(s)
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<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 type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Check manually that you have calibration peaks.	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<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
------------------	----------------------	--------------------

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* ^ (HydroNert 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
PFTD 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 Teldink 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
- ☐ Need technical support, FAQs? - www.agilent.com/chem/techsupp
- ☐ Need supplies? - www.agilent.com/chem/supplies

Service Completion

Service request number 6007478109 Date service completed 13 Feb 2025

Agilent signature Sp N. Customer signature Jutarat Jaemvich

Number of pages in this document _____

ภาคผนวก จ

หนังสืออนุญาตขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน
จากกรมโรงงานอุตสาหกรรม



ที่ อก ๐๓๑๐(๑)/ ๑๑ ๐ ๑ ๖

กรมโรงงานอุตสาหกรรม
ถนนพระรามที่ ๖ แขวงทุ่งพญาไท
เขตราชเทวี กรุงเทพฯ ๑๐๔๐๐

๒๐ 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 สิ่งปฏิกูล หรือวัสดุที่ไม่ใช้แล้ว และดิน ตามสิ่งที่ส่งมาด้วย ๓

หนังสือฉบับนี้จะหมดอายุในวันที่ ๒ พฤษภาคม ๒๕๖๘ หากประสงค์จะต่ออายุหนังสือรับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน ให้ยื่นคำขอต่ออายุพร้อมเอกสารประกอบคำขอต่อกรมโรงงานอุตสาหกรรมภายใน ๓๐ วัน ก่อนวันสิ้นอายุของหนังสือรับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน ซึ่งคำขอต่ออายุดังกล่าวขอรับได้ที่กรมโรงงานอุตสาหกรรม ทั้งนี้ สามารถยื่นคำขอผ่านระบบอิเล็กทรอนิกส์ได้ที่หน้าเว็บไซต์กรมโรงงานอุตสาหกรรม

จึงเรียนมาเพื่อทราบ

ขอแสดงความนับถือ

(นายประสม ดำรงพงษ์)

กองวิจัยและเตือนภัยมลพิษโรงงาน ผู้อำนวยการกองวิจัยและเตือนภัยมลพิษโรงงาน
ปฏิบัติราชการแทนอธิบดีกรมโรงงานอุตสาหกรรม

โทร. ๐ ๒๔๓๐ ๖๓๑๒ ต่อ ๒๑๐๓-๕

โทรสาร ๐ ๒๔๓๐ ๖๓๑๒ ต่อ ๒๑๕๙

ไปรษณีย์อิเล็กทรอนิกส์ saraban@diw.mail.go.th



“อุตสาหกรรมก้าวหน้า ประเทศไทยก้าวหน้า ร่วมกันพัฒนา อุตสาหกรรมสีเขียว”



ส่งที่ส่งมาด้วย ๑

เอกสารแนบท้ายหนังสือรับต่ออายุขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน

บริษัท ซีคอต จำกัด

เลขทะเบียน ว-๒๓๙

ที่ อก ๐๓๑๐(๑)/ ๑๑ ๐ ๑ ๖

ลงวันที่ ๒๐ กรกฎาคม ๒๕๖๖

ก. ผู้ควบคุมดูแลห้องปฏิบัติการวิเคราะห์ จำนวน ๑๐ ราย

๑) นายขรรชัย เกรียงไกรอุดม

๒) นางสาวณิศา เกรียงไกรอุดม

๓) นางสาวธนา ทิพย์รักษ์

๔) นางสาวเชมชุตตา อินทร์ศรี

๕) นางสาวปริดา สมใจ

๖) นางสาวอริญญา มาตา

๗) นางสาวลดาวัลย์ วงศ์เจริญ

๘) นางสาวณัฏฐพร เกตุวันดี

๙) นางสาวนริสา ภูวสรเพ็ชญ์

๑๐) นางสาวศิริวรรณ นิมสง่า

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

จก

เอกสารแนบท้ายหนังสือรับต่ออายุขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน

บริษัท ซีคอฟ จำกัด

ที่ อก ๐๓๑๐(๑)/ ๑๑ ๐ ๑ ๖

เลขทะเบียน ว-๒๓๙

ลงวันที่ ๒๐ กรกฎาคม ๒๕๖๖

ข. เจ้าหน้าที่ประจำห้องปฏิบัติการวิเคราะห์ จำนวน ๓๘ ราย

- ๑) นางสาวสุดาพร สุนทร
- ๒) นางสาวสุภาทิพย์ เทียนเตี้ย
- ๓) นางสาวสุนันทา ศิริพัฒนานนท์
- ๔) นายบวร ดีชัยยะ
- ๕) นางสาวเกศรินทร์ วรเดโชวิทยา
- ๖) นายอนันต์ พิรมวันนา
- ๗) นายชิตพล สมประสงค์
- ๘) นางสาวศศิธร พรหมประเสริฐ
- ๙) นายศิวนนท์ กุลวงษ์
- ๑๐) นางสาวอลิษา คณิรานนท์
- ๑๑) นางสาวสิริวรรณ แก้วชิงดวง
- ๑๒) นางสาวปัทมวรรณ สุวรรณวิโรจน์
- ๑๓) นางสาวกนิษฐา เจริญเชื้อ
- ๑๔) นายวัชรกานต์ ประมาคเต
- ๑๕) นายชอง เองชวลกุล
- ๑๖) นางสาวกฤษณา จันทุม
- ๑๗) นางสาวพรนภา บุตรธรรม
- ๑๘) นางสาวธาริณี อาจปลิว
- ๑๙) นายธนโชติ ฟ่างลือ
- ๒๐) นางสาวพัชรา สมานฉันท์
- ๒๑) นางสาวจุฑาทิณี แจ่มเรือน
- ๒๒) นางสาวณิศา กุ้ยอ่อน
- ๒๓) นายกิตติพงศ์ ตะเกียงสุ
- ๒๔) นายจิรวัฒน์ โคตรคำหาญ
- ๒๕) นายชนะพล อัครผล
- ๒๖) นางสาวทิพย์สุดา วรรณการ
- ๒๗) นายสิทธิชัย สว่างวงศ์ไชย
- ๒๘) นายพิษณุ สีนามเพ็ง
- ๒๙) นายรัตนชัย ขอบท่ากิจ
- ๓๐) นายธนาวุฒิ ต่วนแสง
- ๓๑) นายณัฐชัย ไชยโคตร
- ๓๒) นายณัฐดนัย กฤษณะโสม
- ๓๓) นายศุภชัย สุขใหม่
- ๓๔) นายธอมกานต์ เหลี่ยมมอด
- ๓๕) นางสาวสุภาวดี บัวแก้ว
- ๓๖) นางสาวมาเรียณี ฮาแว
- ๓๗) นางสาววิระยา ปัจฉิมบุรณ์
- ๓๘) นางสาวศลิษา อินทรีย์

- ทะเบียนเลขที่ ว-๒๓๙-จ-๐๐๐๑
ทะเบียนเลขที่ ว-๒๓๙-จ-๐๐๐๒
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ทะเบียนเลขที่ ว-๒๓๙-จ-๐๐๐๔
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ทะเบียนเลขที่ ว-๒๓๙-จ-๐๐๒๗
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ทะเบียนเลขที่ ว-๒๓๙-จ-๐๐๒๙
ทะเบียนเลขที่ ว-๒๓๙-จ-๐๐๓๐
ทะเบียนเลขที่ ว-๒๓๙-จ-๐๐๓๑
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ทะเบียนเลขที่ ว-๒๓๙-จ-๐๐๓๗
ทะเบียนเลขที่ ว-๒๓๙-จ-๐๐๓๘
ทะเบียนเลขที่ ว-๒๓๙-จ-๐๐๓๙

3/3/3/

สิ่งที่ส่งมาด้วย ๒

เอกสารแนบท้ายหนังสือรับต่ออายุขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน

บริษัท ซีคอฟ จำกัด

ที่ อก ๐๓๑๐(๑)/ ๑๑ ๐ ๑ ๖

เลขทะเบียน ว-๒๓๙

ลงวันที่ ๒๐ กรกฎาคม ๒๕๖๖

ขอขยายสารมลพิษที่ได้รับขึ้นทะเบียนจากกรมโรงงานอุตสาหกรรม จำนวน ๓๕๕ รายการ

น้ำเสีย จำนวน 45 รายการ

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
1	Aldrin	1) Liquid-Liquid Extraction, Gas Chromatographic Method ⁽⁴⁾ 2) Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ⁽⁴⁾
2	Arsenic	1) Digestion, Hydride Generation/Atomic Absorption Spectrometric Method ⁽⁴⁾ 2) Digestion, Inductively Coupled Plasma Method ⁽⁴⁾
3	Barium	1) Digestion, Direct Nitrous Oxide-Acetylene Flame Method ⁽⁴⁾ 2) Digestion, Inductively Coupled Plasma Method ⁽⁴⁾
4	α-BHC	1) Liquid-Liquid Extraction, Gas Chromatographic Method ⁽⁴⁾ 2) Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ⁽⁴⁾
5	β-BHC	1) Liquid-Liquid Extraction, Gas Chromatographic Method ⁽⁴⁾ 2) Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ⁽⁴⁾
6	δ-BHC	1) Liquid-Liquid Extraction, Gas Chromatographic Method ⁽⁴⁾ 2) Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ⁽⁴⁾
7	γ-BHC	1) Liquid-Liquid Extraction, Gas Chromatographic Method ⁽⁴⁾ 2) Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ⁽⁴⁾

3/3/3/

สิ่งที่ส่งมาด้วย ๓

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
8	Biochemical Oxygen Demand	1) 5-Day BOD Test, Azide Modification Method ^[4] 2) 5-Day BOD Test, Membrane Electrode Method ^[4]
9	Cadmium	1) Digestion, Direct Air-Acetylene Flame Method ^[4] 2) Digestion, Electrothermal Atomic Absorption Spectrometric Method ^[4] 3) Digestion, Inductively Coupled Plasma Method ^[4]
10	Chemical Oxygen Demand	1) Open Reflux, Titrimetric method ^[4] 2) Closed Reflux, Colorimetric method ^[4] 3) Closed Reflux, Titrimetric Method ^[4]
11	Chlordane	1) Liquid-Liquid Extraction, Gas Chromatographic Method ^[4] 2) Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[4]
12	Chromium	1) Digestion, Direct Air-Acetylene Flame Method ^[4] 2) Digestion, Electrothermal Atomic Absorption Spectrometric Method ^[4] 3) Digestion, Inductively Coupled Plasma Method ^[4]
13	Color	ADMI Weighted-Ordinate Spectrophotometric Method ^[4]
14	Copper	1) Digestion, Direct Air-Acetylene Flame Method ^[4] 2) Digestion, Electrothermal Atomic Absorption Spectrometric Method ^[4] 3) Digestion, Inductively Coupled Plasma Method ^[4]
15	Cyanide	Distillation, Colorimetric method ^[4]
16	4,4'-DDD	1) Liquid-Liquid Extraction, Gas Chromatographic Method ^[4] 2) Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[4]

17 4,4'-DDE...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
17	4,4'-DDE	1) Liquid-Liquid Extraction, Gas Chromatographic Method ^[4] 2) Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[4]
18	4,4'-DDT	1) Liquid-Liquid Extraction, Gas Chromatographic Method ^[4] 2) Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[4]
19	Dieldrin	1) Liquid-Liquid Extraction, Gas Chromatographic Method ^[4] 2) Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[4]
20	Endosulfan I	1) Liquid-Liquid Extraction, Gas Chromatographic Method ^[4] 2) Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[4]
21	Endosulfan II	1) Liquid-Liquid Extraction, Gas Chromatographic Method ^[4] 2) Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[4]
22	Endosulfan Sulfate	1) Liquid-Liquid Extraction, Gas Chromatographic Method ^[4] 2) Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[4]
23	Endrin	1) Liquid-Liquid Extraction, Gas Chromatographic Method ^[4] 2) Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[4]
24	Endrin Aldehyde	1) Liquid-Liquid Extraction, Gas Chromatographic Method ^[4] 2) Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[4]

25 Formaldehyde...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
25	Formaldehyde	Distillation, Colorimetric Method ^[3]
26	Free Chlorine	1) Iodometric Method ^[4] 2) DPD Colorimetric Method ^[4]
27	Heptachlor	1) Liquid-Liquid Extraction, Gas Chromatographic Method ^[4] 2) Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[4]
28	Heptachlor epoxide	1) Liquid-Liquid Extraction, Gas Chromatographic Method ^[4] 2) Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[4]
29	Hexavalent Chromium	1) Colorimetric Method ^[4] 2) Extraction, Air-Acetylene Flame Method ^[4]
30	Lead	1) Digestion, Direct Air-Acetylene Flame Method ^[4] 2) Digestion, Electrothermal Atomic Absorption Spectrometric Method ^[4] 3) Digestion, Inductively Coupled Plasma Method ^[4]
31	Manganese	1) Digestion, Direct Air-Acetylene Flame Method ^[4] 2) Digestion, Electrothermal Atomic Absorption Spectrometric Method ^[4] 3) Digestion, Inductively Coupled Plasma Method ^[4]
32	Mercury	Digestion, Cold-Vapor Atomic Absorption Spectrometric Method ^[4]
33	Methoxychlor	1) Liquid-Liquid Extraction, Gas Chromatographic Method ^[4] 2) Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[4]
34	Nickel	1) Digestion, Direct Air-Acetylene Flame Method ^[4] 2) Digestion, Electrothermal Atomic Absorption Spectrometric Method ^[4] <i>สมป</i>

3) Digestion...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
		3) Digestion, Inductively Coupled Plasma Method ^[4]
35	Oil & Grease	1) Liquid-Liquid, Partition-Gravimetric Method ^[4] 2) Soxhlet Extraction Method ^[4]
36	pH	Electrometric Method ^[4]
37	Phenols	1) Distillation, Chloroform Extraction Method ^[4] 2) Distillation, Direct Photometric Method ^[4]
38	Selenium	1) Digestion, Hydride Generation/Atomic Absorption Spectrometric Method ^[4] 2) Digestion, Inductively Coupled Plasma Method ^[4]
39	Sulfide	1) Iodometric method ^[4] 2) Methylene blue method ^[4]
40	Temperature	Laboratory and Field Methods ^[4]
41	Total Dissolved Solids	Dried at 180 °C ^[4]
42	Total Kjeldahl Nitrogen	1) Macro Kjeldahl Method ^[4] 2) Semi-Micro Kjeldahl Method ^[4]
43	Total Suspended Solids	Dried at 103-105 °C ^[4]
44	Trivalent Chromium	1) Digestion, Direct Air-Acetylene Flame Method; Colorimetric Method; Calculation ^[4] 2) Digestion, Electrothermal Atomic Absorption Spectrometric Method; Colorimetric Method; Calculation ^[4] 3) Digestion, Inductively Coupled Plasma Method; Colorimetric Method; Calculation ^[4]
45	Zinc	1) Digestion, Direct Air-Acetylene Flame Method ^[4] 2) Digestion, Electrothermal Atomic Absorption Spectrometric Method ^[4] 3) Digestion, Inductively Coupled Plasma Method ^[4] <i>สมป</i>

น้ำใต้ดิน จำนวน 125 รายการ

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
1	Acenaphthene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
2	Acetone	Purge and Trap Gas Chromatographic/Mass Spectrometric Method ⁽⁴⁾
3	Aldrin	1) Liquid-Liquid Extraction, Gas Chromatographic Method ⁽⁴⁾ 2) Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
4	Anthracene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
5	Antimony	Digestion, Inductively Coupled Plasma Spectrometric Method ⁽⁴⁾
6	Arsenic	1) Digestion, Hydride Generation/Atomic Absorption Spectrometric Method ⁽⁴⁾ 2) Digestion, Inductively Coupled Plasma Method ⁽⁴⁾
7	Atrazine	Liquid-Liquid Extraction, Gas Chromatographic Method ⁽⁴⁾
8	Barium	1) Digestion, Direct Nitrous Oxide-Acetylene Flame Method ⁽⁴⁾ 2) Digestion, Inductively Coupled Plasma Spectrometric Method ⁽⁴⁾
9	Benz(a)anthracene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
10	Benzene	Purge and Trap Gas Chromatographic/Mass spectrometric Method ⁽⁴⁾
11	Benzo(b)fluoranthene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
12	Benzo(k)fluoranthene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾ 3.1.1)

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
13	Benzoic acid	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
14	Benzo(a)pyrene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
15	Benzo(g,h,i)perylene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
16	Beryllium	Digestion, Inductively Coupled Plasma Spectrometric Method ⁽⁴⁾
17	Bis(2-chloroethyl)ether	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
18	Bis(2-ethylhexyl)phthalate	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
19	Bromodichloromethane	Purge and Trap Gas Chromatographic/Mass Spectrometric Method ⁽⁴⁾
20	Bromoforn	Purge and Trap Gas Chromatographic/Mass Spectrometric Method ⁽⁴⁾
21	Butanol	Purge and Trap Gas Chromatographic/Mass Spectrometric Method ⁽⁴⁾
22	Butyl benzyl phthalate	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
23	Cadmium	1) Digestion, Direct Air-Acetylene Flame Method ⁽⁴⁾ 2) Digestion, Electrothermal Atomic Absorption Spectrometric Method ⁽⁴⁾ 3) Digestion, Inductively Coupled Plasma Spectrometric Method ⁽⁴⁾
24	Carbazole	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ⁽⁴⁾
25	Carbon disulfide	Purge and Trap Gas Chromatographic/Mass Spectrometric Method ⁽⁴⁾
26	Carbon tetrachloride	Purge and Trap Gas Chromatographic/Mass Spectrometric Method ⁽⁴⁾ 3.1.1)

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
27	Chlordane	1) Liquid-Liquid Extraction, Gas Chromatographic Method ^[4] 2) Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[4]
28	p-Chloroaniline	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[4]
29	Chlorobenzene	Purge and Trap Gas Chromatographic/Mass Spectrometric Method ^[4]
30	Chlorodibromomethane	Purge and Trap Gas Chromatographic/Mass Spectrometric Method ^[4]
31	Chloroform	Purge and Trap Gas Chromatographic/Mass Spectrometric Method ^[4]
32	2-Chlorophenol	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[4]
33	Chromium	1) Digestion, Direct Air-Acetylene Flame Method ^[4] 2) Digestion, Electrothermal Atomic Absorption Spectrometric Method ^[4] 3) Digestion, Inductively Coupled Plasma Spectrometric Method ^[4]
34	Chromium (III)	1) Digestion, Direct Air-Acetylene Flame Method; Colorimetric Method; Calculation ^[4] 2) Digestion, Electrothermal Atomic Absorption Spectrometric Method; Colorimetric Method; Calculation ^[4] 3) Digestion, Inductively Coupled Plasma Spectrometric Method; Colorimetric Method; Calculation ^[4]
35	Chromium (VI)	1) Colorimetric Method ^[4] 2) Extraction, Air-Acetylene Flame Method ^[4]
36	Chrysene	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[4] <i>Simple</i>

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
37	Cyanide	1) Distillation, Titrimetric Method ^[4] 2) Distillation, Colorimetric Method ^[4]
38	2,4-D	Liquid-Liquid Extraction, Gas Chromatographic Method ^[4]
39	DDD	1) Liquid-Liquid Extraction, Gas Chromatographic Method ^[4] 2) Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[4]
40	DDE	1) Liquid-Liquid Extraction, Gas Chromatographic Method ^[4] 2) Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[4]
41	DDT	1) Liquid-Liquid Extraction, Gas Chromatographic Method ^[4] 2) Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[4]
42	Dibenz(a,h)anthracene	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[4]
43	Di-n-butyl phthalate	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[4]
44	1,2-Dichlorobenzene	Purge and Trap Gas Chromatographic/Mass Spectrometric Method ^[4]
45	1,3-Dichlorobenzene	Purge and Trap Gas Chromatographic/Mass Spectrometric Method ^[4]
46	1,4-Dichlorobenzene	Purge and Trap Gas Chromatographic/Mass Spectrometric Method ^[4]
47	3,3'-Dichlorobenzidine	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[4]
48	1,1-Dichloroethane	Purge and Trap Gas Chromatographic/Mass Spectrometric Method ^[4]
49	1,2-Dichloroethane	Purge and Trap Gas Chromatographic/Mass Spectrometric Method ^[4] <i>Simple</i>

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
50	1,1-Dichloroethylene	Purge and Trap Gas Chromatographic/Mass Spectrometric Method ^[4]
51	cis-1,2-Dichloroethylene	Purge and Trap Gas Chromatographic/Mass Spectrometric Method ^[4]
52	trans-1,2-Dichloroethylene	Purge and Trap Gas Chromatographic/Mass Spectrometric Method ^[4]
53	2,4-Dichlorophenol	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[4]
54	1,2-Dichloropropane	Purge and Trap Gas Chromatographic/Mass Spectrometric Method ^[4]
55	1,3-Dichloropropane	Purge and Trap Gas Chromatographic/Mass Spectrometric Method ^[4]
56	1,3-Dichloropropene	Purge and Trap Gas Chromatographic/Mass Spectrometric Method ^[4]
57	Dieldrin	1) Liquid-Liquid Extraction, Gas Chromatographic Method ^[4] 2) Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[4]
58	Diethyl phthalate	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[4]
59	2,4-Dimethylphenol	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[4]
60	2,4-Dinitrophenol	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[4]
61	2,4-Dinitrotoluene	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[4]
62	2,6-Dinitrotoluene	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[4]
63	Di-n-Octyl phthalate	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[4]
64	Endosulfan	1) Liquid-Liquid Extraction, Gas Chromatographic Method ^[4] 2) Liquid-Liquid...

2) Liquid-Liquid...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
65	Endrin	2) Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[4] 1) Liquid-Liquid Extraction, Gas Chromatographic Method ^[4] 2) Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[4]
66	Ethylbenzene	Purge and Trap Gas Chromatographic/Mass Spectrometric Method ^[4]
67	Fluoranthene	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[4]
68	Fluorene	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[4]
69	Heptachlor	1) Liquid-Liquid Extraction, Gas Chromatographic Method ^[4] 2) Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[4]
70	Heptachlor epoxide	1) Liquid-Liquid Extraction, Gas Chromatographic Method ^[4] 2) Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[4]
71	Hexachlorobenzene	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[4]
72	Hexachloro-1,3-butadiene	Purge and Trap Gas Chromatographic/Mass Spectrometric Method ^[4]
73	n-Hexane	Purge and Trap Gas Chromatographic/Mass Spectrometric Method ^[4]
74	α-HCH	1) Liquid-Liquid Extraction, Gas Chromatographic Method ^[4] 2) Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[4]
75	β-HCH	1) Liquid-Liquid Extraction, Gas Chromatographic Method ^[4] 2) Liquid-Liquid...

2) Liquid-Liquid...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
76	γ-HCH	2) Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[4] 1) Liquid-Liquid Extraction, Gas Chromatographic Method ^[4]
77	Hexachlorocyclopentadiene	2) Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[4] Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[4]
78	Hexachloroethane	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[4]
79	Indeno(1,2,3-cd)pyrene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[4]
80	Isophorone	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[4]
81	Lead	1) Digestion, Direct Air-Acetylene Flame Method ^[4] 2) Digestion, Electrothermal Atomic Absorption Spectrometric Method ^[4] 3) Digestion, Inductively Coupled Plasma Spectrometric Method ^[4]
82	Manganese	1) Digestion, Direct Air-Acetylene Flame Method ^[4] 2) Digestion, Electrothermal Atomic Absorption Spectrometric Method ^[4] 3) Digestion, Inductively Coupled Plasma Spectrometric Method ^[4]
83	Mercury	Digestion, Cold-Vapor Atomic Absorption Spectrometric Method ^[4]
84	Methanol	Purge and Trap Gas Chromatographic/ Mass spectrometric Method ^[4]
85	Methoxychlor	Liquid-Liquid Extraction, Gas Chromatographic Method ^[4]
86	Methyl bromide	Purge and Trap Gas Chromatographic/Mass Spectrometric Method ^[4]

87 Methylene chloride...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
87	Methylene chloride	Purge and Trap Gas Chromatographic/Mass Spectrometric Method ^[4]
88	2-Methylphenol	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[4]
89	2-Methylnaphthalene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[4]
90	Methyl tert-butyl ether	Purge and Trap Gas Chromatographic/Mass Spectrometric Method ^[4]
91	Naphthalene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[4]
92	Nickel	1) Digestion, Direct Air-Acetylene Flame Method ^[4] 2) Digestion, Electrothermal Atomic Absorption Spectrometric Method ^[4] 3) Digestion, Inductively Coupled Plasma Spectrometric Method ^[4]
93	Nitrobenzene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[4]
94	N-Nitrosodiphenylamine	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[4]
95	N-Nitrosodi-n-propylamine	Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[4]
96	Polychlorinated Biphenyls - PCB-1016 - PCB-1221 - PCB-1232 - PCB-1242 - PCB-1248 - PCB-1254 - PCB-1260	Liquid-Liquid Extraction, Gas Chromatographic Method ^[4]
97	Pentachlorophenol	Liquid-Liquid Extraction, Gas Chromatographic Method ^[4]
98	pH	Electrometric method ^[4]

99 Phenanthrene...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
99	Phenanthrene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[4]
100	Phenol	1) Distillation, Chloroform Extraction Method ^[4] 2) Distillation, Direct Photometric Method ^[4] 3) Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[4]
101	Pyrene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[4]
102	Selenium	1) Digestion, Hydride Generation/Atomic Absorption Spectrometric Method ^[4] 2) Digestion, Inductively Coupled Plasma Method ^[4]
103	Silver	1) Digestion, Direct Air-Acetylene Flame Method ^[4] 2) Digestion, Inductively Coupled Plasma Method ^[4]
104	Styrene	Purge and Trap Gas Chromatographic/Mass Spectrometric Method ^[4]
105	1,1,2,2-Tetrachloroethane	Purge and Trap Gas Chromatographic/Mass Spectrometric Method ^[4]
106	Tetrachloroethylene	Purge and Trap Gas Chromatographic/Mass Spectrometric Method ^[4]
107	Toluene	Purge and Trap Gas Chromatographic/Mass Spectrometric Method ^[4]
108	TPH (C ₅ -C ₈)	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^[12,25]
109	TPH (C ₈ -C ₁₆)	1) Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic Method ^[9,21] 2) Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic/Mass spectrometric Method ^[9,25]
110	TPH (C ₁₆ -C ₃₅)	1) Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic Method ^[9,21] <i>simul</i>

2) Separatory...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
		2) Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic/Mass spectrometric Method ^[9,25]
111	1,2,4-Trichlorobenzene	Purge and Trap Gas Chromatographic/Mass Spectrometric Method ^[4]
112	1,1,1-Trichloroethane	Purge and Trap Gas Chromatographic/Mass Spectrometric Method ^[4]
113	1,1,2-Trichloroethane	Purge and Trap Gas Chromatographic/Mass Spectrometric Method ^[4]
114	Trichloroethylene	Purge and Trap Gas Chromatographic/Mass Spectrometric Method ^[4]
115	2,4,5-Trichlorophenol	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[4]
116	2,4,6-Trichlorophenol	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[4]
117	1,3,5-Trimethylbenzene	Purge and Trap Gas Chromatographic/Mass Spectrometric Method ^[4]
118	Vanadium	Digestion, Inductively Coupled Plasma Spectrometric Method ^[4]
119	Vinyl acetate	Purge and Trap Gas Chromatographic/Mass Spectrometric Method ^[4]
120	Vinyl chloride	Purge and Trap Gas Chromatographic/Mass Spectrometric Method ^[4]
121	m-Xylene	Purge and Trap Gas Chromatographic/Mass Spectrometric Method ^[4]
122	o-Xylene	Purge and Trap Gas Chromatographic/Mass Spectrometric Method ^[4]
123	p-Xylene	Purge and Trap Gas Chromatographic/Mass Spectrometric Method ^[4]
124	Xylene (Total)	Purge and Trap Gas Chromatographic/Mass Spectrometric Method ^[4] <i>simul</i>

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
125	Zinc	1) Digestion, Direct Air-Acetylene Flame Method ^[4] 2) Digestion, Electrothermal Atomic Absorption Spectrometric Method ^[4] 3) Digestion, Inductively Coupled Plasma Spectrometric Method ^[4]

อากาศเสีย (ปล่องระบาย) จำนวน 27 รายการ

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
1	Antimony	1) Isokinetic Sampling, Digestion, Direct Air-Acetylene Flame Method ^[5] 2) Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method ^[5]
2	Arsenic	1) Isokinetic Sampling, Digestion, Hydride Generation/Atomic Absorption Spectrometric Method ^[5] 2) Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method ^[5]
3	Beryllium	Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method ^[5]
4	Cadmium	1) Isokinetic Sampling, Digestion, Direct Air-Acetylene Flame Method ^[5] 2) Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method ^[5]
5	Carbon monoxide	Instrumental Analyzer Method ^[5]
6	Chlorine	1) Absorption Sampling, Ion Chromatographic Method ^[5] 2) Isokinetic Sampling, Ion Chromatographic Method ^[5]
7	Chromium	1) Isokinetic Sampling, Digestion, Direct Air-Acetylene Flame Method ^[5] 2) Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method ^[5] 31mg

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
8	Cobalt	Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method ^[5]
9	Copper	1) Isokinetic Sampling, Digestion, Direct Air-Acetylene Flame Method ^[5] 2) Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method ^[5]
10	Cresol	Adsorption Sampling, Gas Chromatographic Method ^[5]
11	Dioxin/Furans	Isokinetic Sampling ^[5]
12	Hydrogen chloride	1) Absorption Sampling, Ion Chromatographic Method ^[5] 2) Isokinetic Sampling, Ion Chromatographic Method ^[5]
13	Hydrogen Fluoride	1) Absorption Sampling, Ion Chromatographic Method ^[5] 2) Isokinetic Sampling, Ion Chromatographic Method ^[5]
14	Hydrogen Sulfide	Absorption Sampling, Iodometric Method ^[5]
15	Lead	1) Isokinetic Sampling, Digestion, Direct Air-Acetylene Flame Method ^[5] 2) Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method ^[5]
16	Manganese	1) Isokinetic Sampling, Digestion, Direct Air-Acetylene Flame Method ^[5] 2) Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method ^[5]
17	Mercury	Isokinetic Sampling, Digestion, Cold-Vapor Atomic Absorption Spectrometric Method ^[5]
18	Nickel	1) Isokinetic Sampling, Digestion, Direct Air-Acetylene Flame Method ^[5] 2) Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method ^[5] 31mg

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
19	Opacity	Ringelmann's Method ^[2]
20	Oxides of Nitrogen	1) Absorption Sampling, Phenoldisulfonic acid Method ^[5] 2) Absorption Sampling, Ion Chromatographic Method ^[5] 3) Instrumental Analyzer Method ^[5]
21	Selenium	1) Isokinetic Sampling, Digestion, Hydride Generation/Atomic Absorption Spectrometric Method ^[5] 2) Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method ^[5]
22	Sulfur dioxide	1) Isokinetic Sampling, Barium-Thorin Titrimetric Method ^[5] 2) Absorption Sampling, Barium-Thorin Titrimetric Method ^[5] 3) Instrumental Analyzer Method ^[5]
23	Sulfuric acid	Isokinetic Sampling, Barium-Thorin Titrimetric Method ^[5]
24	Tin	Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method ^[5]
25	Total Suspended Particulate	1) Isokinetic Sampling, Gravimetric Method ^[5] 2) Paired Train, Isokinetic Sampling, Gravimetric Method ^[5]
26	Vanadium	Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method ^[5]
27	Xylene	1) Adsorption Sampling, Gas Chromatographic Method ^[5] 2) Adsorption Sampling, Gas Chromatographic/Mass Spectrometric Method ^[5]

สิ่งปฏิกูล...

สิ่งปฏิกูลหรือวัสดุที่ไม่ใช้แล้ว จำนวน 34 รายการ

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
1	Aldrin	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic Method ^[1,6,9,22] 2) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[1,6,9,27] 3) Soxhlet Extraction, Gas Chromatographic Method ^[10,22] 4) Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^[10,27]
2	Antimony	1) Waste Extraction, Digestion, Hydride Generation/Atomic Absorption Spectrometric Method ^[1,6,16] 2) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^[1,6,14] 3) Digestion, Hydride Generation/Atomic Absorption Spectrometric Method ^[7,16] 4) Digestion, Inductively Coupled Plasma Method ^[7,14]
3	Arsenic	1) Waste Extraction, Digestion, Hydride Generation/Atomic Absorption Spectrometric Method ^[1,6,16] 2) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^[1,6,14] 3) Digestion, Hydride Generation/Atomic Absorption Spectrometric Method ^[7,16] 4) Digestion, Inductively Coupled Plasma Method ^[7,14]
4	Barium	1) Waste Extraction, Digestion, Flame Atomic Absorption Spectrometric Method ^[1,6,15]

2) Waste Extraction...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
5	Beryllium	2) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^[1,6,14] 3) Digestion, Flame Atomic Absorption Spectrometric Method ^[7,15] 4) Digestion, Inductively Coupled Plasma Method ^[7,14]
6	Cadmium	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^[1,6,14] 2) Digestion, Inductively Coupled Plasma Method ^[7,14]
7	Chlordane	1) Waste Extraction, Digestion, Flame Atomic Absorption Spectrometric Method ^[1,6,15] 2) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^[1,6,14] 3) Digestion, Flame Atomic Absorption Spectrometric Method ^[7,15] 4) Digestion, Inductively Coupled Plasma Method ^[7,14]
8	Chromium	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic Method ^[1,9,22] 2) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[1,9,27] 3) Soxhlet Extraction, Gas Chromatographic Method ^[10,22] 4) Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^[10,27] 1) Waste Extraction, Digestion, Flame Atomic Absorption Spectrometric Method ^[1,6,15] 2) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^[1,6,14] <i>3) Digestion...</i>

3) Digestion...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
9	Chromium (III)	3) Digestion, Flame Atomic Absorption Spectrometric Method ^[7,15] 4) Digestion, Inductively Coupled Plasma Method ^[7,14] 1) Waste Extraction, Digestion, Flame Atomic Absorption Spectrometric Method; Waste Extraction, Colorimetric Method; Calculation ^[1,6,15,17] 2) Waste Extraction, Digestion, Inductively Coupled Plasma Method; Waste Extraction, Colorimetric Method; Calculation ^[1,6,14,17]
10	Chromium (VI)	3) Digestion, Flame Atomic Absorption Spectrometric Method; Alkaline Digestion, Colorimetric Method; Calculation ^[7,8,15,17] 4) Digestion, Inductively Coupled Plasma Method; Alkaline Digestion, Colorimetric Method; Calculation ^[7,8,14,17]
11	Cobalt	1) Waste Extraction, Colorimetric Method ^[1,17] 2) Alkaline Digestion, Colorimetric Method ^[8,17]
12	Copper	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^[1,6,14] 2) Digestion, Inductively Coupled Plasma Method ^[7,14] 1) Waste Extraction, Digestion, Flame Atomic Absorption Spectrometric Method ^[1,6,15] 2) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^[1,6,14] 3) Digestion, Flame Atomic Absorption Spectrometric Method ^[7,15] 4) Digestion, Inductively Coupled Plasma Method ^[7,14] <i>3) Digestion...</i>

13 2,4-D...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
13	2,4-D	1) Waste Extraction, Gas Chromatographic/Mass Spectrometric Method ^[1,25] 2) Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^[25]
14	DDD	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic Method ^[1,9,22] 2) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[1,9,27] 3) Soxhlet Extraction, Gas Chromatographic Method ^[10,22] 4) Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^[10,27]
15	DDE	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic Method ^[1,9,22] 2) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[1,9,27] 3) Soxhlet Extraction, Gas Chromatographic Method ^[10,22] 4) Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^[10,27]
16	DDT	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic Method ^[1,9,22] 2) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[1,9,27] 3) Soxhlet Extraction, Gas Chromatographic Method ^[10,22] 4) Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^[10,27]

17 Dieldrin...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
17	Dieldrin	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic Method ^[1,9,22] 2) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[1,9,27] 3) Soxhlet Extraction, Gas Chromatographic Method ^[10,22] 4) Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^[10,27]
18	Endrin	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic Method ^[1,9,22] 2) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[1,9,27] 3) Soxhlet Extraction, Gas Chromatographic Method ^[10,22] 4) Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^[10,27]
19	Heptachlor	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic Method ^[1,9,22] 2) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method ^[1,9,27] 3) Soxhlet Extraction, Gas Chromatographic Method ^[10,22] 4) Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^[10,27]
20	Lead	1) Waste Extraction, Digestion, Flame Atomic Absorption Spectrometric Method ^[1,6,15] 2) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^[1,6,14]

3) Digestion...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
21	Lindane	3) Digestion, Flame Atomic Absorption Spectrometric Method ^[7,15] 4) Digestion, Inductively Coupled Plasma Method ^[7,14] 1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic Method ^[1,9,22] 2) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[1,9,27] 3) Soxhlet Extraction, Gas Chromatographic Method ^[10,22] 4) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[10,27]
22	Mercury	1) Waste Extraction, Digestion, Cold-Vapor Atomic Absorption Spectrometric Method ^[1,18] 2) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^[1,6,14] 3) Digestion, Cold-Vapor Atomic Absorption Spectrometric Method ^[19] 4) Digestion, Inductively Coupled Plasma Method ^[7,14]
23	Methoxychlor	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic Method ^[1,9,22] 2) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[1,9,27] 3) Soxhlet Extraction, Gas Chromatographic Method ^[10,22] 4) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[10,27]


24 Molybdenum...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
24	Molybdenum	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^[1,6,14] 2) Digestion, Inductively Coupled Plasma Method ^[7,14]
25	Nickel	1) Waste Extraction, Digestion, Flame Atomic Absorption Spectrometric Method ^[1,6,15] 2) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^[1,6,14] 3) Digestion, Flame Atomic Absorption Spectrometric Method ^[7,15] 4) Digestion, Inductively Coupled Plasma Method ^[7,14]
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 ^[1,9,23] 2) Soxhlet Extraction, Gas Chromatographic Method ^[10,23]
27	Pentachlorophenol	1) Waste Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[1,25] 2) Ultrasonic Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[25]
28	pH	Electrometric Method ^[31,32]
29	Selenium	1) Waste Extraction, Digestion, Hydride Generation/Atomic Absorption Spectrometric Method ^[1,6,20] 2) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^[1,6,14] 3) Digestion, Hydride Generation/Atomic Absorption Spectrometric Method ^[7,20]


4) Digestion...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
30	Silver	4) Digestion, Inductively Coupled Plasma Method ^[7,14] 1) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^[1,6,14] 2) Digestion, Inductively Coupled Plasma Method ^[7,14]
31	Thallium	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^[1,6,14] 2) Digestion, Inductively Coupled Plasma Method ^[7,14]
32	Trichloroethylene	1) Waste Extraction, Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^[1,12,26] 2) Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^[12,26]
33	Vanadium	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^[1,6,14] 2) Digestion, Inductively Coupled Plasma Method ^[7,14]
34	Zinc	1) Waste Extraction, Digestion, Flame Atomic Absorption Spectrometric Method ^[1,6,15] 2) Waste Extraction, Digestion, Inductively Coupled Plasma Method ^[1,6,14] 3) Digestion, Flame Atomic Absorption Spectrometric Method ^[7,15] 4) Digestion, Inductively Coupled Plasma Method ^[7,14]

ดิน จำนวน 124 รายการ

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
1	Acenaphthene	Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^[10,27] 

2 Acetone...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
2	Acetone	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^[13,26]
3	Aldrin	1) Ultrasonic Extraction, Gas Chromatographic Method ^[11,22] 2) Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^[11,27]
4	Anthracene	Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^[10,27]
5	Antimony	1) Digestion, Hydride Generation/Atomic Absorption Spectrometric Method ^[7,16] 2) Digestion, Inductively Coupled Plasma Method ^[7,14]
6	Arsenic	1) Digestion, Hydride Generation/Atomic Absorption Spectrometric Method ^[7,16] 2) Digestion, Inductively Coupled Plasma Method ^[7,14]
7	Atrazine	Ultrasonic Extraction, Gas Chromatographic Method ^[11,24]
8	Barium	1) Digestion, Flame Atomic Absorption Spectrometric Method ^[7,15] 2) Digestion, Inductively Coupled Plasma Method ^[7,14]
9	Benz(a)anthracene	Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^[10,27]
10	Benzene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^[13,26]
11	Benzo(b)fluoranthene	Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^[10,27]
12	Benzo(k)fluoranthene	Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^[10,27]
13	Benzoic acid	Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^[11,27] 

14 Benzo(a)pyrene...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
14	Benzo(a)pyrene	Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[10,27]
15	Benzo(g,h,i)perylene	Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[10,27]
16	Beryllium	Digestion, Inductively Coupled Plasma Method ^[7,14]
17	Bis(2-chloroethyl)ether	Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[10,27]
18	Bis(2-ethylhexyl)phthalate	Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[10,27]
19	Bromodichloromethane	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^[13,26]
20	Bromoform	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^[13,26]
21	Butanol	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^[13,26]
22	Butyl benzyl phthalate	Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[10,27]
23	Cadmium	1) Digestion, Flame Atomic Absorption Spectrometric Method ^[7,15] 2) Digestion, Inductively Coupled Plasma Method ^[7,14]
24	Carbazole	Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[10,27]
25	Carbon disulfide	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^[13,26]
26	Carbon tetrachloride	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^[13,26]
27	Chlordane	1) Ultrasonic Extraction, Gas Chromatographic Method ^[11,22] 2) Ultrasonic Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[11,27]

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
28	p-Chloroaniline	Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[10,27]
29	Chlorobenzene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^[13,26]
30	Chlorodibromomethane	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^[13,26]
31	Chloroform	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^[13,26]
32	2-Chlorophenol	Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^[11,27]
33	Chromium	1) Digestion, Flame Atomic Absorption Spectrometric Method ^[7,15] 2) Digestion, Inductively Coupled Plasma Method ^[7,14]
34	Chromium (III)	1) Digestion, Flame Atomic Absorption Spectrometric Method; Colorimetric Method; Calculation ^[7,8,15,17] 2) Digestion, Inductively Coupled Plasma Method; Colorimetric Method; Calculation ^[7,8,14,17]
35	Chromium (VI)	Alkaline Digestion, Colorimetric Method ^[8,17]
36	Chrysene	Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[10,27]
37	Cyanide	1) Extraction, Distillation, Titrimetric Method ^[28,29,30] 2) Extraction, Distillation, Colorimetric Method ^[28,29,30]
38	2,4-D	Ultrasonic Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[24]
39	DDD	1) Ultrasonic Extraction, Gas Chromatographic Method ^[11,22] 2) Ultrasonic Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[11,27]

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
40	DDE	1) Ultrasonic Extraction, Gas Chromatographic Method ^[11,22] 2) Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^[11,27]
41	DDT	1) Ultrasonic Extraction, Gas Chromatographic Method ^[11,22] 2) Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^[11,27]
42	Dibenz(a,h)anthracene	Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^[10,27]
43	Di-n-butyl phthalate	Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^[10,27]
44	1,2-Dichlorobenzene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^[13,26]
45	1,3-Dichlorobenzene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^[13,26]
46	1,4-Dichlorobenzene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^[13,26]
47	3,3'-Dichlorobenzidine	Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^[10,27]
48	1,1-Dichloroethane	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^[13,26]
49	1,2-Dichloroethane	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^[13,26]
50	1,1-Dichloroethylene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^[13,26]
51	cis-1,2-Dichloroethylene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^[13,26]
52	trans-1,2-Dichloroethylene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^[13,26]
53	2,4-Dichlorophenol	Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^[11,27]

54 1,2-Dichloropropane...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
54	1,2-Dichloropropane	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^[13,26]
55	1,3-Dichloropropane	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^[13,26]
56	1,3-Dichloropropene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^[13,26]
57	Dieldrin	1) Ultrasonic Extraction, Gas Chromatographic Method ^[11,22] 2) Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^[11,27]
58	Diethyl phthalate	Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^[10,27]
59	2,4-Dimethylphenol	Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^[11,27]
60	2,4-Dinitrophenol	Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^[11,27]
61	2,4-Dinitrotoluene	Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^[10,27]
62	2,6-Dinitrotoluene	Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^[10,27]
63	Di-n-Octyl phthalate	Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^[10,27]
64	Endosulfan	1) Ultrasonic Extraction, Gas Chromatographic Method ^[11,22] 2) Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^[11,27]
65	Endrin	1) Ultrasonic Extraction, Gas Chromatographic Method ^[11,22] 2) Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^[11,27]
66	Ethylbenzene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^[13,26]

67 Fluoranthene...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
67	Fluoranthene	Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[10,27]
68	Fluorene	Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[10,27]
69	Heptachlor	1) Ultrasonic Extraction, Gas Chromatographic Method ^[11,22] 2) Ultrasonic Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[11,27]
70	Heptachlor epoxide	1) Ultrasonic Extraction, Gas Chromatographic Method ^[11,22] 2) Ultrasonic Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[11,27]
71	Hexachlorobenzene	Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^[11,27]
72	Hexachloro-1,3-butadiene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^[13,26]
73	n-Hexane	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method ^[13,26]
74	α-HCH	1) Ultrasonic Extraction, Gas Chromatographic Method ^[11,22] 2) Ultrasonic Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[11,27]
75	β-HCH	1) Ultrasonic Extraction, Gas Chromatographic Method ^[11,22] 2) Ultrasonic Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[11,27]
76	γ-HCH	1) Ultrasonic Extraction, Gas Chromatographic Method ^[11,22] 2) Ultrasonic Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[11,27]
77	Hexachlorocyclopentadiene	Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^[10,27] <i>simul</i>

78 Hexachloroethane...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
78	Hexachloroethane	Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^[10,27]
79	Indeno(1,2,3-cd)pyrene	Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^[10,27]
80	Isophorone	Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^[10,27]
81	Lead	1) Digestion, Flame Atomic Absorption Spectrometric Method ^[7,15] 2) Digestion, Inductively Coupled Plasma Method ^[7,14]
82	Manganese	1) Digestion, Flame Atomic Absorption Spectrometric Method ^[7,15] 2) Digestion, Inductively Coupled Plasma Method ^[7,14]
83	Mercury	1) Digestion, Cold-Vapor Atomic Absorption Spectrometric Method ^[19] 2) Digestion, Inductively Coupled Plasma Method ^[7,14]
84	Methanol	Ultrasonic Extraction, Direct Aqueous Injection, Gas Chromatographic Method ^[11,21]
85	Methoxychlor	1) Ultrasonic Extraction, Gas Chromatographic Method ^[11,22] 2) Ultrasonic Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[11,27]
86	Methyl bromide	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^[13,26]
87	Methylene chloride	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^[13,26]
88	2-Methylphenol	Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^[11,27]
89	2-Methylnaphthalene	Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^[11,27] <i>simul</i>

90 Methyl tert-butyl ether...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
90	Methyl tert-butyl ether	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^(13,26)
91	Naphthalene	Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^(10,27)
92	Nickel	1) Digestion, Flame Atomic Absorption Spectrometric Method ^(7,15) 2) Digestion, Inductively Coupled Plasma Method ^(7,14)
93	Nitrobenzene	Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^(10,27)
94	N-Nitrosodiphenylamine	Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^(10,27)
95	N-Nitrosodi-n-propylamine	Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^(10,27)
96	Polychlorinated Biphenyls - Aroclor 1016 - Aroclor 1221 - Aroclor 1232 - Aroclor 1242 - Aroclor 1248 - Aroclor 1254 - Aroclor 1260	Soxhlet Extraction, Gas Chromatographic Method ^(10,23)
97	Pentachlorophenol	Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ⁽²⁴⁾
98	Phenanthrene	Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^(10,27)
99	Phenol	Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method ^(11,27)
100	Pyrene	Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method ^(10,27)
101	Selenium	1) Digestion, Hydride Generation/Atomic Absorption Spectrometric Method ^(7,20)

2) Digestion...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
102	Silver	2) Digestion, Inductively Coupled Plasma Method ^(7,14) 1) Digestion, Flame Atomic Absorption Spectrometric Method ^(7,15) 2) Digestion, Inductively Coupled Plasma Method ^(7,14)
103	Styrene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^(13,26)
104	1,1,2,2-Tetrachloroethane	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^(13,26)
105	Tetrachloroethylene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^(13,26)
106	Toluene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^(13,26)
107	TPH (C ₅ -C ₈)	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^(13,26)
108	TPH (C ₈ -C ₁₆)	1) Soxhlet Extraction, Gas Chromatographic Method ^(10,21) 2) Soxhlet Extraction, Gas Chromatographic/Mass spectrometric Method ^(10,26)
109	TPH (C ₁₆ -C ₃₅)	1) Soxhlet Extraction, Gas Chromatographic Method ^(10,21) 2) Soxhlet Extraction, Gas Chromatographic/Mass spectrometric Method ^(10,26)
110	1,2,4-Trichlorobenzene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^(13,26)
111	1,1,1-Trichloroethane	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^(13,26)
112	1,1,2-Trichloroethane	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^(13,26)
113	Trichloroethylene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^(13,26)

114 2,4,5-Trichlorophenol...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
114	2,4,5-Trichlorophenol	Ultrasonic Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[11,27]
115	2,4,6-Trichlorophenol	Ultrasonic Extraction, Gas Chromatographic/ Mass Spectrometric Method ^[11,27]
116	1,3,5-Trimethylbenzene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^[13,26]
117	Vanadium	Digestion, Inductively Coupled Plasma Method ^[7,14]
118	Vinyl acetate	Purge and Trap, Gas Chromatographic/Mass spectrometric Method ^[13,26]
119	Vinyl chloride	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^[13,26]
120	m-Xylene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^[13,26]
121	o-Xylene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^[13,26]
122	p-Xylene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^[13,26]
123	Xylene (Total)	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method ^[13,26]
124	Zinc	1) Digestion, Flame Atomic Absorption Spectrometric Method ^[7,15] 2) Digestion, Inductively Coupled Plasma Method ^[7,14] <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) นายวิรัชกานต์ ประมาคเต

ทะเบียนเลขที่ ว-๒๓๙-จ-๐๐๑๕

๒) นายรัตนชัย ขอบทำกิจ

ทะเบียนเลขที่ ว-๒๓๙-จ-๐๐๓๐

จึงเรียนมาเพื่อทราบ

ขอแสดงความนับถือ


(นายพรยศ กลั่นกรอง)
รองอธิบดี ปฏิบัติราชการแทน
อธิบดีกรมโรงงานอุตสาหกรรม

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"



ที่ อก ๐๓๑๐(๑)/ ๑๑ ๕๕ ๗



กรมโรงงานอุตสาหกรรม
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
ความละเอียดแจ้งแล้ว นั้น

กรมโรงงานอุตสาหกรรมพิจารณาแล้ว ให้ยกเลิกเจ้าหน้าที่ประจำห้องปฏิบัติการวิเคราะห์
จำนวน ๓ ราย ได้แก่

๑) นางสาวพัชรา สมานฉันท

ทะเบียนเลขที่ ว-๒๓๙-จ-๐๐๒๑

๒) นางสาวสุภาวดี บัวแก้ว

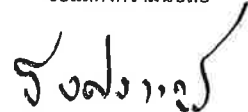
ทะเบียนเลขที่ ว-๒๓๙-จ-๐๐๓๖

๓) นางสาวมาริยาณี ฮาแว

ทะเบียนเลขที่ ว-๒๓๙-จ-๐๐๓๗

จึงเรียนมาเพื่อทราบ

ขอแสดงความนับถือ


(นายธีรศักดิ์ อิศรางกูร ณ อยุธยา)
รองอธิบดี ปฏิบัติราชการแทน
อธิบดีกรมโรงงานอุตสาหกรรม

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"



ภาคผนวก ช

ใบรับรองความสามารถห้องปฏิบัติการและขอบข่ายการรับรอง
ห้องปฏิบัติการทดสอบ ตามมาตรฐาน ISO/IEC 17025
จากสำนักงานมาตรฐานอุตสาหกรรม (สมอ.)



แบบ กษช./สมอ.๒
Form NSC/TISI 2

ใบรับรองเลขที่ 24-LB0026
(Certificate No.)

ใบรับรองระบบงาน (Certificate of Accreditation)

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

เลขาธิการสำนักงานมาตรฐานผลิตภัณฑ์อุตสาหกรรม
(Secretary-General, Thai Industrial Standards Institute)

ออกใบรับรองฉบับนี้ให้
(Issues this certificate to)

บริษัท ซีคอต จำกัด ฝ่ายห้องปฏิบัติการทดสอบด้านสิ่งแวดล้อม
(Secot Company Limited, Environmental Laboratory Division)

ตั้งอยู่เลขที่
(Address)

๒๓๙ ถนนริมคลองประปา แขวงบางซื่อ เขตบางซื่อ กรุงเทพมหานคร
(239 Rimklongprapa Road, 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)

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

ออกให้ ณ วันที่ ๖ ธันวาคม พ.ศ. ๒๕๖๖
(Issue date : 6 December B.E. 2566 (2023))

(นายวีระศักดิ์ เพ็งหล่ง)

ผู้อำนวยการสำนักงานคณะกรรมการการมาตรฐานแห่งชาติ

ปฏิบัติราชการแทน

เลขาธิการสำนักงานมาตรฐานผลิตภัณฑ์อุตสาหกรรม



กระทรวงอุตสาหกรรม สำนักงานมาตรฐานผลิตภัณฑ์อุตสาหกรรม
(Ministry of Industry Thailand, Thai Industrial Standards Institute)



รายละเอียดสาขาและขอบข่ายใบรับรองห้องปฏิบัติการ
(Scope of Accreditation for Testing)
ใบรับรองเลขที่ 24-LB0026
(Certification No. 24-LB0026)



ชื่อห้องปฏิบัติการ
(Laboratory Name)

หมายเลขการรับรองที่
(Accreditation No.)

ฉบับที่ 03
(Issue No. 03)

สถานภาพห้องปฏิบัติการ
(Laboratory status)

บริษัท ซีคอต จำกัด ฝ่ายห้องปฏิบัติการทดสอบด้านสิ่งแวดล้อม
(Secot Company Limited, Environmental Laboratory Division)

ทดสอบ 0394
(Testing 0394)

ออกให้ตั้งแต่วันที่ 15 กันยายน พ.ศ. 2568
(Valid from 15 September B.E.2568 (2025))

☒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)
สาขาสสิ่งแวดล้อม (Environmental field)		
1. น้ำและน้ำเสีย (Water and wastewater)	- Heavy metals • Arsenic (As) 0.000 5 mg/L to 0.090 0 mg/L • Arsenic (As) 0.05 mg/L to 4.50 mg/L • Barium (Ba) 0.02 mg/L to 4.50 mg/L • Cadmium (Cd) 0.01 mg/L to 4.50 mg/L • Chromium (Cr) 0.01 mg/L to 4.50 mg/L	- Standard Methods for the Examination of Water and Wastewater, APHA, AWWA, WEF, 24 th edition, 2023, Part 3030 F and Part 3114 C - Standard Methods for the Examination of Water and Wastewater, APHA, AWWA, WEF, 24 th edition, 2023, Part 3030 E and Part 3120 B

กระทรวงอุตสาหกรรมสำนักงานมาตรฐานผลิตภัณฑ์อุตสาหกรรม
(Ministry of Industry, Thai Industrial Standards Institute)

รายละเอียดสาขาและขอบข่ายใบรับรองห้องปฏิบัติการ
(Scope of Accreditation for Testing)
ใบรับรองเลขที่ 24-LB0026
(Certification No. 24-LB0026)



ฉบับที่ 03
(Issue No. 03)
ออกให้ตั้งแต่วันที่ 15 กันยายน พ.ศ. 2568
(Valid from 15 September B.E.2568 (2025))
สถานภาพห้องปฏิบัติการ ☒ 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)
<p>สาขาส่งแวดล้อม (Environmental field)</p> <p>1. น้ำและน้ำเสีย (ต่อ) (Water and wastewater) (cont.)</p>	<p>- Heavy metals</p> <ul style="list-style-type: none"> Copper (Cu) 0.02 mg/L to 4.50 mg/L Iron (Fe) 0.05 mg/L to 9.00 mg/L Lead (Pb) 0.03 mg/L to 4.50 mg/L Manganese (Mn) 0.01 mg/L to 9.00 mg/L Nickel (Ni) 0.01 mg/L to 4.50 mg/L Zinc (Zn) 0.02 mg/L to 9.00 mg/L <p>- Chemical oxygen demand (COD) 10.00 mg/L to 9 000 mg/L</p>	<p>- Standard Methods for the Examination of Water and Wastewater, APHA, AWWA, WEF, 24th edition, 2023, Part 3030 E and Part 3120 B</p> <p>- Standard Methods for the Examination of Water and Wastewater, APHA, AWWA, WEF, 24th edition, 2023, Part 5220 D</p>

รายละเอียดสาขาและขอบข่ายใบรับรองห้องปฏิบัติการ
(Scope of Accreditation for Testing)
ใบรับรองเลขที่ 24-LB0026
(Certification No. 24-LB0026)



ฉบับที่ 03
(Issue No. 03)
ออกให้ตั้งแต่วันที่ 15 กันยายน พ.ศ. 2568
(Valid from 15 September B.E.2568 (2025))
สถานภาพห้องปฏิบัติการ ☒ 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)
<p>สาขาส่งแวดล้อม (Environmental field)</p> <p>2. บริเวณทำงาน (Workplace)</p>	<p>- Total dust 0.10 mg/filter to 2.00 mg/filter</p> <p>- Respirable dust 0.10 mg/filter to 2.00 mg/filter</p> <p>- Benzene 0.70 µg/tube to 420 µg/tube</p> <p>- Toluene 0.70 µg/tube to 420 µg/tube</p> <p>- Total xylenes 1.40 µg/tube to 840 µg/tube</p> <p>- m, p-Xylene 0.70 µg/tube to 420 µg/tube</p>	<p>- NIOSH Manual of Analytical Methods (NMAM), Method 0500, 4th edition, 15th August 1994 (Exclude Sampling)</p> <p>- NIOSH Manual of Analytical Methods (NMAM), Method 0600, 4th edition, 15th January 1998 (Exclude Sampling)</p> <p>- NIOSH Manual of Analytical Methods (NMAM), Method 1501, 4th edition, 15th March 2003 (Exclude Sampling)</p>

รายละเอียดสาขาและขอบข่ายใบรับรองห้องปฏิบัติการ
(Scope of Accreditation for Testing)
ใบรับรองเลขที่ 24-LB0026
(Certification No. 24-LB0026)



ฉบับที่ 03
(Issue No. 03)

ออกให้ตั้งแต่วันที่ 15 กันยายน พ.ศ. 2568
(Valid from 15 September B.E.2568 (2025))

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>สาขาส่งแวดล้อม (Environmental field)</p> <p>2. บริเวณทำงาน (ต่อ) (Workplace) (Cont.)</p> <p>3. ปล่องระบายอากาศ (Stack)</p>	<p>- o-Xylene 0.70 $\mu\text{g}/\text{tube}$ to 420 $\mu\text{g}/\text{tube}$</p> <p>- Sulfur dioxide 1.00 mg/L to 16 000 mg/L</p> <p>- Hydrogen fluoride 5 $\mu\text{g}/\text{sample}$ to 400 $\mu\text{g}/\text{sample}$</p> <p>- Hydrogen chloride 5 $\mu\text{g}/\text{sample}$ to 400 $\mu\text{g}/\text{sample}$</p>	<p>- NIOSH Manual of Analytical Methods (NMAM), Method 1501, 4th edition, 15th March 2003 (Exclude Sampling)</p> <p>- US.EPA, Code of Federal Regulations, 40 CFR 60 appendix A, Method 6, July 2024 (Exclude Sampling)</p> <p>- WI-7.2-1-22 based on US.EPA, Code of Federal Regulations, 40 CFR 60 appendix A, Method 26, 26A, 2024</p>

รายละเอียดสาขาและขอบข่ายใบรับรองห้องปฏิบัติการ
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ฉบับที่ 03
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ออกให้ตั้งแต่วันที่ 15 กันยายน พ.ศ. 2568
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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>สาขาส่งแวดล้อม (Environmental field)</p> <p>4. บรรยากาศทั่วไป (Ambient air)</p>	<p>- Volatile organic compounds (VOCs)</p> <ul style="list-style-type: none"> Chloroethene 0.05 $\mu\text{g}/\text{m}^3$ to 51.00 $\mu\text{g}/\text{m}^3$ (0.02 ppbv to 20.00 ppbv) 1,3-butadiene 0.04 $\mu\text{g}/\text{m}^3$ to 44.00 $\mu\text{g}/\text{m}^3$ (0.02 ppbv to 20.00 ppbv) Bromomethane 0.08 $\mu\text{g}/\text{m}^3$ to 77.00 $\mu\text{g}/\text{m}^3$ (0.02 ppbv to 20.00 ppbv) Acrolein 0.05 $\mu\text{g}/\text{m}^3$ to 45.00 $\mu\text{g}/\text{m}^3$ (0.02 ppbv to 20.00 ppbv) Acrylonitrile 0.04 $\mu\text{g}/\text{m}^3$ to 43.00 $\mu\text{g}/\text{m}^3$ (0.02 ppbv to 20.00 ppbv) Dichloromethane 0.14 $\mu\text{g}/\text{m}^3$ to 69.00 $\mu\text{g}/\text{m}^3$ 0.04 ppbv to 20.00 ppbv 	<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 03
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ถึงวันที่ 8 กันยายน พ.ศ. 2571
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สถานภาพห้องปฏิบัติการ
(Laboratory status)

☒ ถาวร
(Permanent)

☒ นอกสถานที่
(Site)

☐ ชั่วคราว
(Temporary)

☐ เคลื่อนที่
(Mobile)

☐ หลายสถานที่
(Multisite)

สาขาการทดสอบ (Field of Testing)	รายการทดสอบ (Parameter)	วิธีทดสอบ (Test Method)
<p>สาขาส่งแวดล้อม (Environmental field)</p> <p>4. บรรยากาศทั่วไป (ต่อ) (Ambient air) (cont.)</p>	<p>- Volatile organic compounds (VOCs)</p> <ul style="list-style-type: none"> Carbon disulfide 0.06 $\mu\text{g}/\text{m}^3$ to 62.00 $\mu\text{g}/\text{m}^3$ (0.02 ppbv to 20.00 ppbv) Trichloromethane 0.20 $\mu\text{g}/\text{m}^3$ to 97.00 $\mu\text{g}/\text{m}^3$ (0.04 ppbv to 20.00 ppbv) 1,2-dichloroethane 0.08 $\mu\text{g}/\text{m}^3$ to 80.00 $\mu\text{g}/\text{m}^3$ (0.02 ppbv to 20.00 ppbv) Benzene 0.06 $\mu\text{g}/\text{m}^3$ to 63.00 $\mu\text{g}/\text{m}^3$ (0.02 ppbv to 20.00 ppbv) Carbon tetrachloride 0.25 $\mu\text{g}/\text{m}^3$ to 125 $\mu\text{g}/\text{m}^3$ (0.04 ppbv to 20.00 ppbv) Trichloroethylene 0.21 $\mu\text{g}/\text{m}^3$ to 107 $\mu\text{g}/\text{m}^3$ (0.04 ppbv to 20.00 ppbv) 	<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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☒ ถาวร
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(Temporary)

☐ เคลื่อนที่
(Mobile)

☐ หลายสถานที่
(Multisite)

สาขาการทดสอบ (Field of Testing)	รายการทดสอบ (Parameter)	วิธีทดสอบ (Test Method)
<p>สาขาส่งแวดล้อม (environmental field)</p> <p>4. บรรยากาศทั่วไป (ต่อ) (Ambient air) (Cont.)</p>	<p>- Volatile organic compounds (VOCs)</p> <ul style="list-style-type: none"> 1,2-dichloropropane 0.18 $\mu\text{g}/\text{m}^3$ to 92.00 $\mu\text{g}/\text{m}^3$ (0.04 ppbv to 20.00 ppbv) Tetrachloroethylene 0.27 $\mu\text{g}/\text{m}^3$ to 135 $\mu\text{g}/\text{m}^3$ (0.04 ppbv to 20.00 ppbv) 1,2-dibromoethane 0.31 $\mu\text{g}/\text{m}^3$ to 153 $\mu\text{g}/\text{m}^3$ (0.04 ppbv to 20.00 ppbv) 1,1,2,2-tetrachloroethane 0.69 $\mu\text{g}/\text{m}^3$ to 137 $\mu\text{g}/\text{m}^3$ (0.10 ppbv to 20.00 ppbv) Benzyl chloride 0.52 $\mu\text{g}/\text{m}^3$ to 103 $\mu\text{g}/\text{m}^3$ (0.10 ppbv to 20.00 ppbv) 1,4-dichlorobenzene 0.24 $\mu\text{g}/\text{m}^3$ to 120 $\mu\text{g}/\text{m}^3$ (0.04 ppbv to 20.00 ppbv) 	<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 กบ.บุญ
นิติบุคคล

กรมสวัสดิการและคุ้มครองแรงงาน
ใบอนุญาต

เป็นนิติบุคคลผู้ให้บริการตรวจวัดและวิเคราะห์สภาวะการทำงานเกี่ยวกับระดับเสียง

ใบอนุญาตเลขที่ ๑๔๑๓-๐๓-๒๕๖๕-๑๐๔๘

อนุญาตให้.....บริษัท ซีคอน จำกัด.....

เลขทะเบียนนิติบุคคล ๑๑๑๕๕๖๐๐๐๔๙๖

ตั้งอยู่เลขที่ ๒๓๙ ถนนริมคลองประปา แขวงบางเขิน เขตบางเขน กรุงเทพมหานคร

เป็นนิติบุคคลผู้ให้บริการด้านความปลอดภัย อาชีวอนามัย และสภาพแวดล้อมในการทำงาน ตามกฎกระทรวง กำหนดมาตรฐานในการบริหาร จัดการ และดำเนินการด้านความปลอดภัย อาชีวอนามัย และสภาพแวดล้อมในการทำงานเกี่ยวกับความร้อน แสงสว่าง และเสียง พ.ศ. ๒๕๕๙ ในการตรวจวัดและวิเคราะห์สภาวะการทำงาน เกี่ยวกับระดับเสียง ประกอบกับกฎกระทรวงการขึ้นทะเบียนและการอนุญาตให้บริการเพื่อส่งเสริมความปลอดภัย อาชีวอนามัย และสภาพแวดล้อมในการทำงาน พ.ศ. ๒๕๖๔ แห่งพระราชบัญญัติความปลอดภัย อาชีวอนามัย และสภาพแวดล้อมในการทำงาน พ.ศ. ๒๕๕๔ โดยมีบุคลากร จำนวน ๗ ราย และรายการเครื่องมือตรวจวัด จำนวน ๖๕ เครื่อง ดังรายละเอียดแนบท้ายใบอนุญาตนี้

ทั้งนี้ ตั้งแต่วันที่ ๑๗ มิถุนายน พ.ศ. ๒๕๖๘ ถึงวันที่ ๑๖ มิถุนายน พ.ศ. ๒๕๗๑

ให้ไว้ ณ วันที่ ๒ มิถุนายน พ.ศ. ๒๕๖๘

(นายศักดิ์ศิลป์ ตูลาธร)

ผู้ตรวจราชการกรม ปฏิบัติราชการแทน

อธิบดีกรมสวัสดิการและคุ้มครองแรงงาน

เลขทะเบียนควบคุม
๓-๑๑-๐๔๐๓-๐๕๓-๐๒-๖๘

(ลงนาม).....(นายทะเบียน)

(นางสาวสุวดี ทวีสุข)

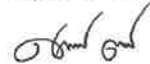
ตำแหน่ง ผู้อำนวยการกองความปลอดภัยแรงงาน

รายชื่อบุคลากรแนบท้ายใบอนุญาต
 เป็นนิติบุคคลผู้ให้บริการตรวจวัดและวิเคราะห์สภาวะการทำงานเกี่ยวกับระดับเสียง
 ของบริษัท ซีคोट จำกัด
 ใบอนุญาตเลขที่ ๐๔๐๓-๐๓-๒๕๖๕-๐๐๔๘

๑. นางสาวสุนันทา ศิรวัฒนานนท์
๒. นางสาวกนิษฐา เจริญเชื้อ
๓. นางสาวอลิษา คนิวรานนท์
๔. นางสาวชนิดา หล้าสาย
๕. นางสาวศลิษา อินริย์
๖. นางสาววิระยา ปัจฉิมบุรณ์
๗. นายพงศ์ศิริ จักรแก้ว

ทั้งนี้ ตั้งแต่วันที่ ๑๗ มิถุนายน พ.ศ. ๒๕๖๘ ถึงวันที่ ๑๖ มิถุนายน พ.ศ. ๒๕๗๑

ให้ไว้ ณ วันที่ ๒ มิถุนายน พ.ศ. ๒๕๖๘



(นายศักดิ์ศิลป์ ตูลาธร)
 ผู้ตรวจราชการกรม ปฏิบัติราชการแทน
 อธิบดีกรมสวัสดิการและคุ้มครองแรงงาน

รายการเครื่องมือตรวจวัดแนบท้ายใบอนุญาต
 เป็นนิติบุคคลผู้ให้บริการตรวจวัดและวิเคราะห์สภาวะการทำงานเกี่ยวกับระดับเสียง
 ของบริษัท ซีคोट จำกัด
 ใบอนุญาตเลขที่ ๐๔๐๓-๐๓-๒๕๖๕-๐๐๔๘

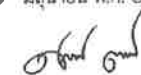
ลำดับที่	รายการเครื่องมือ	รายละเอียด		จำนวน (เครื่อง)
๑	เครื่องวัดเสียง และเครื่องวัดเสียงกระทบหรือเสียงกระแทก	ยี่ห้อ	Cirrus	๑๐
		รุ่น	CR162B	
		Serial No.	G302737	
			G302738	
			G302740	
			G302742	
			G302743	
			G301014	
			G302333	
			G302330	
			G302237	
			G300709	
		มาตรฐาน	IEC 61672-1	๓
		ยี่ห้อ	Cirrus	
		รุ่น	CR162C	
		Serial No.	G300832	
			G300838	
			G300841	
		มาตรฐาน	IEC 61672-1	๒
		ยี่ห้อ	Cirrus	
		รุ่น	CR171B	
		Serial No.	G303411	
			G303415	
		มาตรฐาน	IEC 61672-1	๑๕
		ยี่ห้อ	SCARLET TECH	
		รุ่น	ST-21D	
		Serial No.	820722	
			820723	
			820724	
			820725	
			820726	
			820727	

ลำดับที่	รายการเครื่องมือ	รายละเอียด		จำนวน (เครื่อง)
			820728 820729 820730 820731 821078 821079 821080 821081 821082	
		มาตรฐาน	IEC 61672	
๒	เครื่องวัดปริมาณเสียงสะสม	ยี่ห้อ	Cirrus	๒๐
		รุ่น	CR:110A	
		Serial No.	CB1023	
			CB1025	
			CB1026	
			CB1040	
			CB1041	
			CB1042	
			CB1043	
			CB1047	
			CB1048	
			CB1049	
			CB1050	
			CB1052	
			CB1053	
			CB1054	
			CB1055	
			CB1056	
			CB1101	
			CB1102	
			CB1103	
			CB1104	
		มาตรฐาน	IEC 61252	
		ยี่ห้อ	Pulsar	๑๐
		รุ่น	Model 22R	

ลำดับที่	รายการเครื่องมือ	รายละเอียด		จำนวน (เครื่อง)
		Serial No.	PB614 PB617 PB618 PB621 PB632 PB636 PB637 PB638 PB643 PB644	
		มาตรฐาน	IEC 61252	
๓	อุปกรณ์ตรวจสอบความถูกต้อง	ยี่ห้อ	Cirrus	๒
		รุ่น	CR:515	
		Serial No.	94296 97097	
		มาตรฐาน	IEC 60942	
๔	อุปกรณ์ตรวจสอบความถูกต้อง (เสียงสะสม)	ยี่ห้อ	Cirrus	๒
		รุ่น	RC:110A	
		Serial No.	95167 95168	
		มาตรฐาน	IEC 60942	
		ยี่ห้อ	Pulsar	๑
		รุ่น	Model 22R	
		Serial No.	79781	
		มาตรฐาน	IEC 60942	

ทั้งนี้ ตั้งแต่วันที่ ๑๗ มิถุนายน พ.ศ. ๒๕๖๘ ถึงวันที่ ๑๖ มิถุนายน พ.ศ. ๒๕๖๙

ให้ไว้ ณ วันที่ ๒ มิถุนายน พ.ศ. ๒๕๖๘



(นายศักดิ์ศิลป์ ตูลาธร)
ผู้ตรวจราชการกรม ปฏิบัติราชการแทน
อธิบดีกรมสวัสดิการและคุ้มครองแรงงาน



แบบ กก.บญ
นิติบุคคล

กรมสวัสดิการและคุ้มครองแรงงาน
ใบอนุญาต
เป็นนิติบุคคลผู้ให้บริการตรวจวัดระดับความเข้มข้นของสารเคมีอันตราย
ในบรรยากาศของสถานที่ทำงานและสถานที่เก็บรักษาสารเคมีอันตราย

ใบอนุญาตเลขที่ ๑๒๑๑-๑๓-๒๕๖๕-๑๑๔๙

อนุญาตให้ นิธิพิศ ธีรกุล ใจดี

เลขทะเบียนนิติบุคคล ๐๑๑๕๕๓๒๐๑๑๘๗๒
ตั้งอยู่ เลขที่ ๒๓๙ ถนนริมคลองประเวศ 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 ๑๕ ราย และรายการเครื่องมือตรวจวัด จำนวน ๕๕ เครื่อง ดังรายละเอียด
แนบท้ายใบอนุญาตนี้

ทั้งนี้ ตั้งแต่วันที่ ๑๙ มิถุนายน พ.ศ. ๒๕๖๘ ถึงวันที่ ๑๓ มิถุนายน พ.ศ. ๒๕๗๑

ให้ไว้ ณ วันที่ ๒๓ พฤษภาคม พ.ศ. ๒๕๖๘

(นายศักดิ์ศิลป์ ตุลาธร)
ผู้ตรวจราชการกรม ปฏิบัติราชการแทน
อธิบดีกรมสวัสดิการและคุ้มครองแรงงาน

เลขทะเบียนควบคุม

๓-๑๑-๐๒๐๑-๐๕๐-๐๒-๖๘

(ลงนาม).....(นายทะเบียน)

(นางสาวสุวิทย์ ทวีสุข)

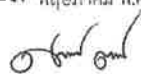
ผู้อำนวยการกองความปลอดภัยแรงงาน

รายชื่อบุคลากรแนบท้ายใบอนุญาต
 เป็นนิติบุคคลผู้ให้บริการตรวจวัดระดับความเข้มข้นของสารเคมีอันตรายในบรรยากาศของสถานที่ทำงาน
 และสถานที่เก็บรักษาสารเคมีอันตราย
 ของบริษัท ซีคอน จำกัด
 ใบอนุญาตเลขที่ ๐๒๐๑-๐๓-๒๕๖๕-๐๐๔๔

๑. นายอิศพล สมประสงค์
๒. นายอนิวัฒน์ พินวนา
๓. นายศิวะนนท์ กุลวงษ์
๔. นายธนโชติ ช่างส้อ
๕. นายกิตติพงศ์ ทะเกิงสุข
๖. นายจิรวัฒน์ โคตรคำหาญ
๗. นายศุภกิจ ต๊ะมูกา
๘. นางสาวหทัยสุดา จรรณการ
๙. นายธนาวุฒิ ส่วนแสง
๑๐. นางสาวศลิษา อินรัมย์
๑๑. นางสาววิระยา ปัจฉิมบุรณ์
๑๒. นายณัฐดนัย กฤษณะโสม
๑๓. นายณัฐชัย ไชยโคตร
๑๔. นายพงศ์ศิริ จักรแก้ว
๑๕. นายอรรถชัย นวนนัม

ทั้งนี้ ตั้งแต่วันที่ ๑๔ มิถุนายน พ.ศ. ๒๕๖๘ ถึงวันที่ ๓๓ มิถุนายน พ.ศ. ๒๕๖๙

ให้ไว้ ณ วันที่ ๒๓ พฤษภาคม พ.ศ. ๒๕๖๘



(นายศักดิ์ศิลป์ ตูลาสร)

ผู้ตรวจราชการกรม ปฏิบัติราชการแทน
 อธิบดีกรมสวัสดิการและคุ้มครองแรงงาน

รายการเครื่องมือตรวจวัดแนบท้ายใบอนุญาต
 เป็นนิติบุคคลผู้ให้บริการตรวจวัดระดับความเข้มข้นของสารเคมีอันตรายในบรรยากาศของสถานที่ทำงาน
 และสถานที่เก็บรักษาสารเคมีอันตราย
 ของบริษัท ซีคอน จำกัด
 ใบอนุญาตเลขที่ ๐๒๐๑-๐๓-๒๕๖๕-๐๐๔๔

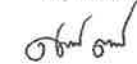
ลำดับที่	รายการเครื่องมือ	รายละเอียด		จำนวน (เครื่อง)
๑	เครื่องมือเก็บตัวอย่างอากาศ (Personal Air Sampling Pump)	ยี่ห้อ รุ่น Serial No.	Sensidyne Gilian BDX II 20190401002 20190401003 20190401006 20190401007 20190401008 20190401013 20190401014 20190401015 20190401019 20190504021 20190504022 20190504023 20190504025 20190504027 20190504028 20190504029 20190504032 20190504034 20190504039 20190504040 20190504042 20190504044 20210602054 20210602055 20210701039 20210701078 20210701079 20210701081	๕๖

ลำดับที่	รายการเครื่องมือ	รายละเอียด		จำนวน (เครื่อง)
	เครื่องมือเก็บตัวอย่างอากาศ (ต่อ) (Personal Air Sampling Pump)		20210701082 20210701086 20210701093 20210904100 20211201089 20211201090 20220104039 20220104042 20220104045 20220104086 20220104087 20220104088 20220104089 20220104090 20220104098 20220104099 20220104100 20220104104	
		ยี่ห้อ รุ่น Serial No.	SKC Pocket Pump TOUCH 220-1000TC 221217 221218 221219 221222 221245	๕
	๒ เครื่องมือและอุปกรณ์สำหรับ ปรับความถูกต้อง (Pump calibrator)	ยี่ห้อ รุ่น Serial No.	Mesa Labs Defender 520-L 160100	๑
		ยี่ห้อ รุ่น Serial No.	Mesa Labs Defender 520-H 114069	๑
		ยี่ห้อ รุ่น Serial No.	SKC Chek-mate 375-0550 N 22552891	๑

ลำดับที่	รายการเครื่องมือ	รายละเอียด		จำนวน (เครื่อง)
	เครื่องมือและอุปกรณ์สำหรับ ปรับความถูกต้อง (ต่อ) (Pump calibrator)	ยี่ห้อ รุ่น Serial No.	SKC Chek-mate 375-00205 N 21552177	๑

ทั้งนี้ ตั้งแต่วันที่ ๑๔ มิถุนายน พ.ศ. ๒๕๖๘ ถึงวันที่ ๑๓ มิถุนายน พ.ศ. ๒๕๗๑

ให้ไว้ ณ วันที่ ๒๗ พฤษภาคม พ.ศ. ๒๕๖๘



(นายศักดิ์ศิลป์ ตูลาธร)

ผู้ตรวจราชการกรม ปฏิบัติราชการแทน
อธิบดีกรมสวัสดิการและคุ้มครองแรงงาน



แบบ ก.ก.บญ
นิติบุคคล

กรมสวัสดิการและคุ้มครองแรงงาน
ใบอนุญาต
เป็นนิติบุคคลผู้ให้บริการวิเคราะห์ระดับความเข้มข้นของสารเคมีอันตราย
ในบรรยากาศของสถานที่ทำงานและสถานที่เก็บรักษาสารเคมีอันตราย

ใบอนุญาตเลขที่ ๑๒๑๒-๑๓-๒๕๖๕-๑๑๓๔

อนุญาตให้ นริพัชร์ ศิริคุณ จักรดี

เลขทะเบียนนิติบุคคล ๐๑๐๕๕๓๖๐๐๐๖๖๖

ตั้งอยู่ เลขที่ ๒๔๔ ถนนมิตรภาพเป็น แขวงบางซื่อ 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 ๑๐ ราย และรายการเครื่องมือวิเคราะห์ จำนวน ๔ เครื่อง ดังรายละเอียด
แนบท้ายใบอนุญาตนี้

ทั้งนี้ ตั้งแต่วันที่ ๑๔ มิถุนายน พ.ศ. ๒๕๖๘ ถึงวันที่ ๑๓ มิถุนายน พ.ศ. ๒๕๗๑

ให้ไว้ ณ วันที่ ๒๓ พฤษภาคม พ.ศ. ๒๕๖๘

(นายศักดิ์ศิลป์ จุลารชร)

ผู้ตรวจราชการกรม ปฏิบัติราชการแทน
อธิบดีกรมสวัสดิการและคุ้มครองแรงงาน

เลขทะเบียนควบคุม

๓-๑๓-๐๒๐๒-๐๓๕-๐๒-๖๘

(ลงนาม).....(นายทะเบียน)

(นางสาวสุวดี ทวีสุข)

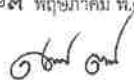
ผู้อำนวยการกองความปลอดภัยแรงงาน

รายชื่อบุคลากรแนบท้ายใบอนุญาต
 เป็นนิติบุคคลผู้ให้บริการวิเคราะห์ระดับความเข้มข้นของสารเคมีอันตรายในบรรยากาศของสถานที่ทำงาน
 และสถานที่เก็บรักษาสารเคมีอันตราย
 ของบริษัท ซีคोट จำกัด
 ใบอนุญาตเลขที่ ๐๒๐๒-๐๒-๒๕๖๕-๐๐๓๔

๑. นางสาวนริสา ภูววรรณเพ็ญ
๒. นางอารยา ทิพรักษ์
๓. นางสาวศิริวรรณ ฉิมสง่า
๔. นางสาวสุชาทิพย์ เทียนเตี้ย
๕. นางสาวพรนภา บุตรธรรม
๖. นางสาวธาริณี อาจบลิวิ
๗. นางสาวจณิสตา กุ้ยอ่อน
๘. นางสาวจุฬารัตน์ แจ่มเรือน
๙. นางสาวสุดาพร สุนทร
๑๐. นางสาวปวีศา มากภักดี

ทั้งนี้ ตั้งแต่วันที่ ๑๔ มิถุนายน พ.ศ. ๒๕๖๘ ถึงวันที่ ๑๓ มิถุนายน พ.ศ. ๒๕๗๑

ให้ไว้ ณ วันที่ ๒๗ พฤษภาคม พ.ศ. ๒๕๖๘



(นายศักดิ์ศิลป์ ตูลาธร)
 ผู้ตรวจราชการกรม ปฏิบัติราชการแทน
 อธิบดีกรมสวัสดิการและคุ้มครองแรงงาน

รายการเครื่องมือวิเคราะห์แนบท้ายใบอนุญาต
 เป็นนิติบุคคลผู้ให้บริการวิเคราะห์ระดับความเข้มข้นของสารเคมีอันตรายในบรรยากาศของสถานที่ทำงาน
 และสถานที่เก็บรักษาสารเคมีอันตราย
 ของบริษัท ซีคोट จำกัด
 ใบอนุญาตเลขที่ ๐๒๐๒-๐๓-๒๕๖๔-๐๐๓๔

ลำดับที่	รายการเครื่องมือ	รายละเอียด		จำนวน (เครื่อง)
๑	Atomic Absorption Spectrophotometer (AAS)	ยี่ห้อ รุ่น Serial No.	Perkin Elmer PinAAcle 900T PTDS23051001	๑
๒	Inductively Coupled Plasma (ICP-OES)	ยี่ห้อ รุ่น Serial No.	Agilent 5110 MY16230003	๑
๓	Gas Chromatograph Flame Ionization Detector (GC-FID)	ยี่ห้อ รุ่น Serial No.	Agilent 7890 B CN 15346147	๑
		ยี่ห้อ รุ่น Serial No.	Agilent 7890 A US10943001	๑
๔	Ion Chromatography	ยี่ห้อ รุ่น Serial No.	Dionex ICS-1000 04090295	๑
๕	Electronic Balance	ยี่ห้อ รุ่น Serial No.	Sartorius ME5, 6 digits SWB26602268	๑
		ยี่ห้อ รุ่น Serial No.	Mettler Toledo AG245, 5 digits 1117293916	๑
		ยี่ห้อ รุ่น Serial No.	Mettler Toledo AB204-S, 4 digits 1123163292	๑

ลำดับที่	รายการเครื่องมือ	รายละเอียด		จำนวน (เครื่อง)
๒	UV/Vis Spectrophotometer	ยี่ห้อ รุ่น Serial No.	Thermo Scientific GENESYS 150 UV-Vis 9A5Y332022	๑

ทั้งนี้ ตั้งแต่วันที่ ๑๔ มิถุนายน พ.ศ. ๒๕๖๘ ถึงวันที่ ๑๓ มิถุนายน พ.ศ. ๒๕๗๑

ให้ไว้ ณ วันที่ ๒๗ พฤษภาคม พ.ศ. ๒๕๖๘



(นายศักดิ์ศิลป์ ตุลาธร)

ผู้ตรวจราชการกรม ปฏิบัติราชการแทน
อธิบดีกรมสวัสดิการและคุ้มครองแรงงาน



ที่ รง ๐๕๐๔/ ๗๕๖๘

กรมสวัสดิการและคุ้มครองแรงงาน
ถนนมิตรไมตรี ดินแดง กรุงเทพฯ ๑๐๔๐๐

๒๐ สิงหาคม ๒๕๖๘

เรื่อง การขอเพิ่มเติมเครื่องมือวิเคราะห์ระดับความเข้มข้นของสารเคมีอันตรายในบรรยากาศของสถานที่ทำงาน
และสถานที่เก็บรักษาสารเคมีอันตราย

เรียน กรรมการผู้จัดการบริษัท ซีคोट จำกัด

อ้างถึง หนังสือบริษัท ซีคोट จำกัด ที่ ชค. (๒) ๐๐๒๔/๒๕๖๘ ลงวันที่ ๑๘ มิถุนายน ๒๕๖๘

สิ่งที่ส่งมาด้วย รายการเครื่องมือ (เพิ่มเติม) แนบท้ายใบอนุญาตเป็นนิติบุคคลผู้ให้บริการวิเคราะห์ระดับความเข้มข้น
ของสารเคมีอันตรายฯ ลงวันที่ ๒๐ สิงหาคม พ.ศ. ๒๕๖๘ จำนวน ๑ ชุด

ตามหนังสือที่อ้างถึง บริษัท ซีคोट จำกัด ขออนุมัติเพิ่มเติมเครื่องมือวิเคราะห์ระดับความเข้มข้น
ของสารเคมีอันตรายในบรรยากาศของสถานที่ทำงานและสถานที่เก็บรักษาสารเคมีอันตราย จำนวน ๑ เครื่อง
สำหรับการเป็นผู้ให้บริการวิเคราะห์ระดับความเข้มข้นของสารเคมีอันตรายฯ ตามกฎกระทรวงการขึ้นทะเบียน
และการอนุญาตให้บริการเพื่อส่งเสริมความปลอดภัย อาชีวอนามัย และสภาพแวดล้อมในการทำงาน
พ.ศ. ๒๕๖๔ เพื่อให้กรมสวัสดิการและคุ้มครองแรงงานพิจารณา ความละเอียดแจ้งแล้ว นั้น

กรมสวัสดิการและคุ้มครองแรงงานพิจารณาแล้วเห็นว่า เครื่องมือวิเคราะห์ระดับความเข้มข้น
ของสารเคมีอันตรายฯ ที่ขออนุมัติเพิ่มเติม เป็นไปตามกฎกระทรวงการขึ้นทะเบียนและการอนุญาตให้บริการ
เพื่อส่งเสริมความปลอดภัยฯ ประกอบกับกฎกระทรวงกำหนดมาตรฐานในการบริหาร จัดการ และดำเนินการ
ด้านความปลอดภัย อาชีวอนามัย และสภาพแวดล้อมในการทำงานเกี่ยวกับสารเคมีอันตราย พ.ศ. ๒๕๖๖
จึงอนุมัติให้บริษัท ซีคोट จำกัด เพิ่มเติมเครื่องมือวิเคราะห์ระดับความเข้มข้นของสารเคมีอันตรายฯ ดังกล่าว
รายละเอียดปรากฏตามสิ่งที่ส่งมาด้วย ทั้งนี้ ขอให้บริษัทฯ ปฏิบัติตามกฎหมายกระทรวงการขึ้นทะเบียนและการอนุญาต
ให้บริการเพื่อส่งเสริมความปลอดภัยฯ อย่างเคร่งครัด

จึงเรียนมาเพื่อทราบ

ขอแสดงความนับถือ



(นายศักดิ์ศิลป์ ตุลาธร)

รองอธิบดี ปฏิบัติราชการแทน
อธิบดีกรมสวัสดิการและคุ้มครองแรงงาน

กองความปลอดภัยแรงงาน

โทรศัพท์ ๐ ๒๔๔๘ ๔๑๒๘ - ๓๔ ต่อ ๗๐๖

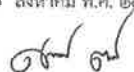
ไปรษณีย์อิเล็กทรอนิกส์ Safetyofficer@labour.mail.go.th

รายการเครื่องมือ (เพิ่มเติม)
แนบท้ายใบอนุญาตเป็นนิติบุคคลผู้ให้บริการวิเคราะห์ระดับความเข้มข้นของสารเคมีอันตราย
ในบรรยากาศของสถานที่ทำงานและสถานที่เก็บรักษาสารเคมีอันตราย
ของบริษัท ซีคอฟ จำกัด
ใบอนุญาตเลขที่ ๐๒๐๒-๐๓-๒๕๖๕-๐๐๓๔

ลำดับที่	รายการเครื่องมือ	รายละเอียด		จำนวน (เครื่อง)
๑	CO Gas Detector	ยี่ห้อ รุ่น Serial No.	Q-Trak 7575 7575X2017002	๑

ทั้งนี้ ตั้งแต่วันที่ ๒๐ สิงหาคม พ.ศ. ๒๕๖๘ ถึงวันที่ ๑๓ มิถุนายน พ.ศ. ๒๕๗๑

ให้ไว้ ณ วันที่ ๒๐ สิงหาคม พ.ศ. ๒๕๖๘



(นายศักดิ์ศิลป์ ดุลาธร)
รองอธิบดี ปฏิบัติราชการแทน
อธิบดีกรมสวัสดิการและคุ้มครองแรงงาน