

## ภาคผนวกที่ 4

ใบอนุญาตห้องปฏิบัติการวิเคราะห์เอกชน



กรมโรงงานอุตสาหกรรม  
ถนนพระรามที่ ๖ เขตราชเทวี  
กรุงเทพมหานคร ๑๐๔๐๐

๓๐ ตุลาคม ๒๕๖๓

เรื่อง ต่ออายุหนังสือรับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน

เรียน กรรมการผู้จัดการ บริษัท เอส.พี.เอส. คอนสตรัคติ้ง เซอร์วิส จำกัด

อ้างถึง คำขอขึ้นทะเบียน/ต่ออายุ/เปลี่ยนแปลงบุคลากร และชนิดสารมลพิษของห้องปฏิบัติการวิเคราะห์เอกชน  
ลงวันที่ ๒ กรกฎาคม ๒๕๖๓

สิ่งที่ส่งมาด้วย ๑. รายชื่อผู้ควบคุมดูแลห้องปฏิบัติการวิเคราะห์ จำนวน ๑ แผ่น

๒. รายชื่อเจ้าหน้าที่ประจำห้องปฏิบัติการวิเคราะห์ จำนวน ๓ แผ่น

๓. ขอบข่ายสารมลพิษที่ได้รับขึ้นทะเบียนจากกรมโรงงานอุตสาหกรรม จำนวน ๒๘ แผ่น

ตามหนังสือที่อ้างถึง บริษัท เอส.พี.เอส. คอนสตรัคติ้ง เซอร์วิส จำกัด ขอต่ออายุหนังสือรับขึ้น  
ทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน เลขทะเบียน ๖-๐๑๑ สถานที่ตั้งเลขที่ ๗ ซอยพหลโยธิน ๒๔ ถนนพหลโยธิน  
แขวงจอมพล เขตจตุจักร กรุงเทพมหานคร ต่อกรมโรงงานอุตสาหกรรม นั้น

กรมโรงงานอุตสาหกรรมพิจารณาแล้ว ให้บริษัท เอส.พี.เอส. คอนสตรัคติ้ง เซอร์วิส จำกัด ต่ออายุ  
หนังสือรับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน โดยมีองค์ประกอบดังนี้

ก. ผู้ควบคุมดูแลห้องปฏิบัติการวิเคราะห์ จำนวน ๓๓ ราย ตามสิ่งที่ส่งมาด้วย ๑

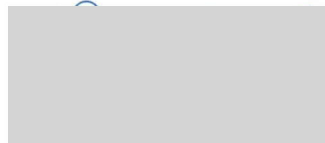
ข. เจ้าหน้าที่ประจำห้องปฏิบัติการวิเคราะห์ จำนวน ๗๙ ราย ตามสิ่งที่ส่งมาด้วย ๒

ค. ขอบข่ายสารมลพิษที่ได้รับขึ้นทะเบียนให้วิเคราะห์ในน้ำเสีย จำนวน ๕๙ รายการ น้ำใต้ดิน  
จำนวน ๑๒๖ รายการ อากาศเสีย จำนวน ๒๘ รายการ สิ่งปฏิกูลหรือวัสดุที่ไม่ใช้แล้ว จำนวน ๓๖ รายการ  
และดิน จำนวน ๑๒๕ รายการ รวมทั้งสิ้นจำนวน ๓๗๔ รายการ ตามสิ่งที่ส่งมาด้วย ๓

หนังสือฉบับนี้จะหมดอายุในวันที่ ๑๐ กรกฎาคม ๒๕๖๖ หากประสงค์จะต่ออายุหนังสือ  
รับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน ให้ยื่นคำขอต่ออายุพร้อมเอกสารประกอบคำขอต่อ  
กรมโรงงานอุตสาหกรรมภายใน ๓๐ วัน ก่อนวันสิ้นอายุของหนังสือรับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน  
ซึ่งคำขอต่ออายุดังกล่าวขอรับได้ที่กรมโรงงานอุตสาหกรรม

จึงเรียนมาเพื่อทราบ

ขอแสดงความนับถือ



กองวิจัยและเตือนภัยมลพิษโรงงาน

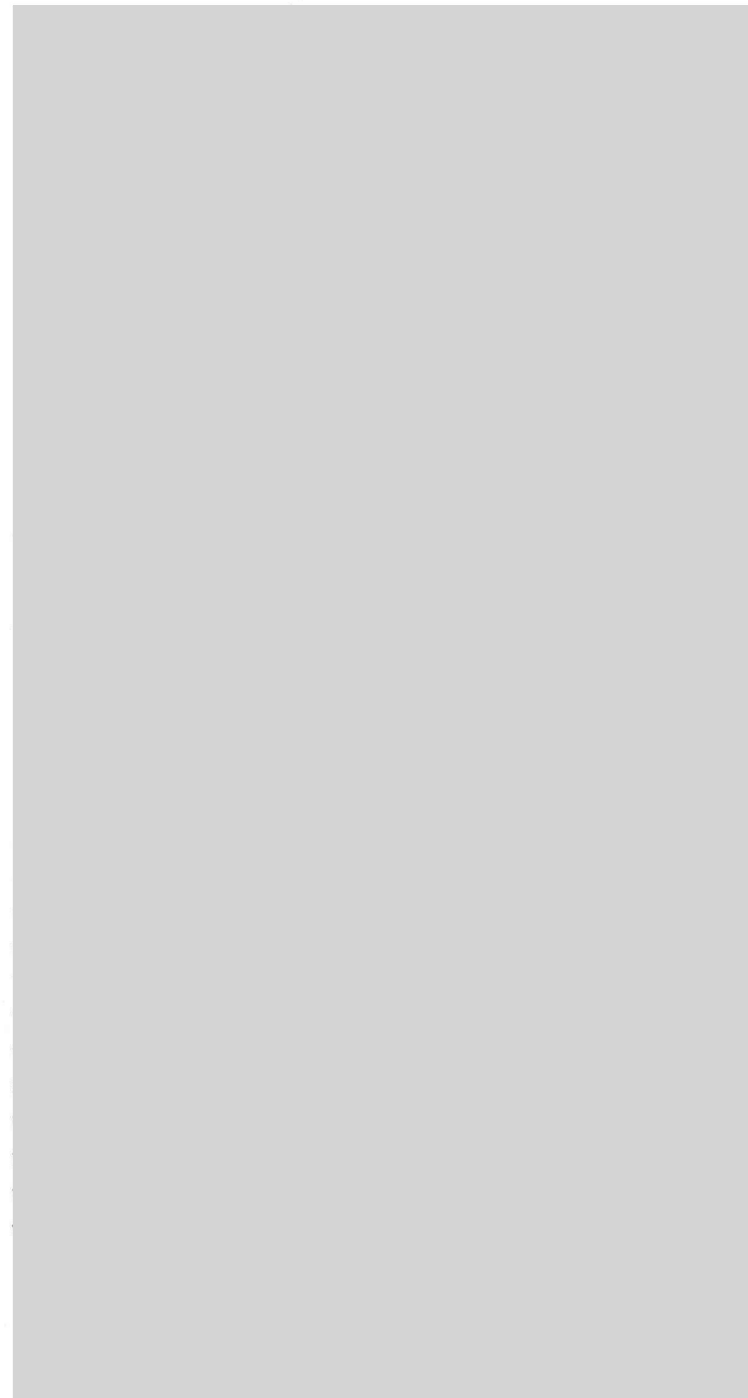
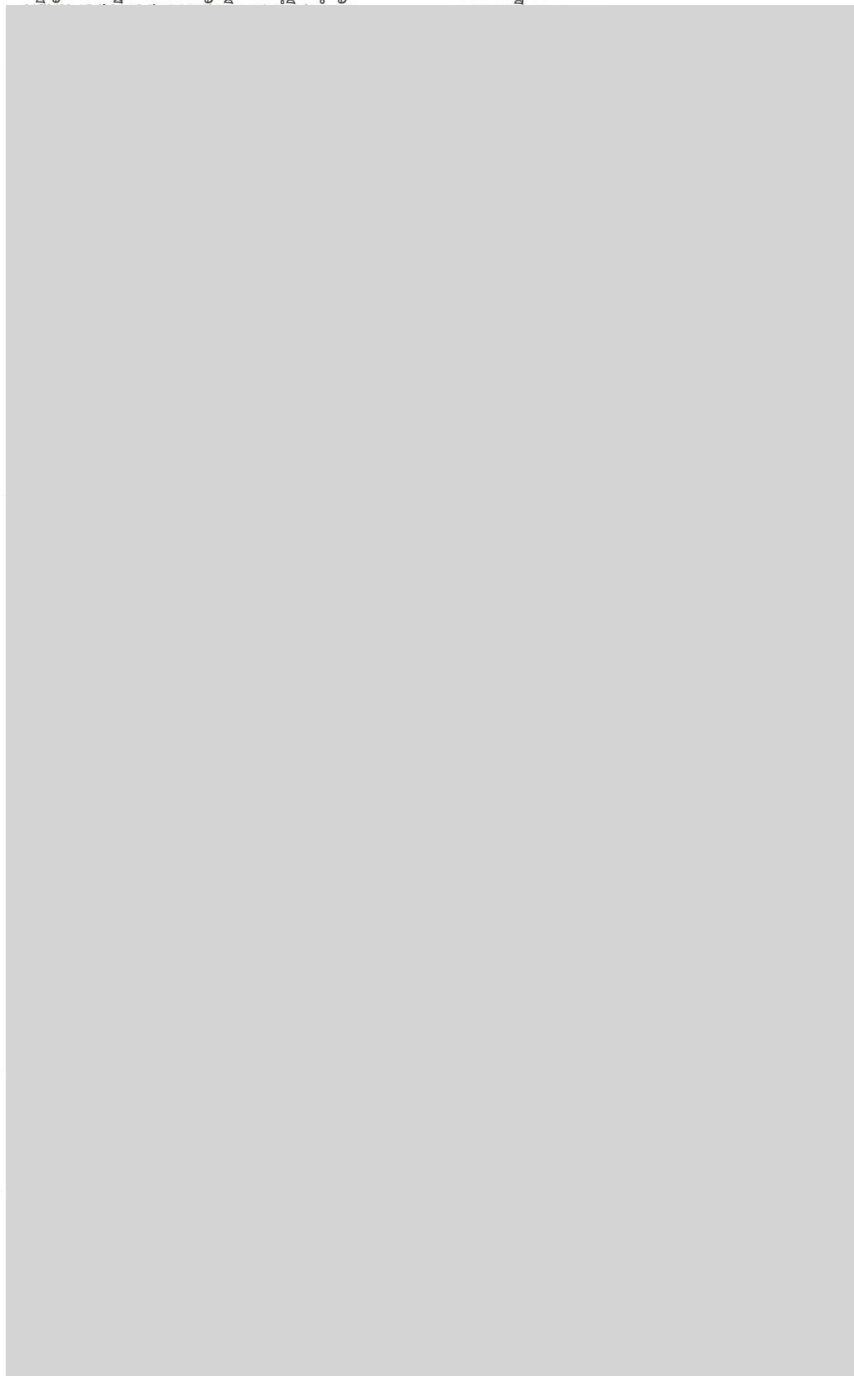
กลุ่มมาตรฐานวิธีการวิเคราะห์ทดสอบมลพิษและทะเบียนห้องปฏิบัติการ

โทร. ๐ ๒๒๐๒ ๔๐๐๒ ๐ ๒๒๐๒ ๔๑๔๖

โทรสาร ๐ ๒๓๕๔ ๓๒๐๘ ๐ ๒๓๕๔ ๓๔๑๕

เอกสารแนบท้ายหนังสือรับต่ออายุขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน  
บริษัท เอส.พี.เอส. คอนสตรัคติ้ง เซอร์วิส จำกัด เลขทะเบียน ๖-๐๑๑

เอกสารแนบท้ายหนังสือรับต่ออายุขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน



เอกสารแนบท้ายหนังสือรับต่ออายุขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน

บริษัท เอส.พี.เอส. คอนสตรัคชั่น เซอร์วิส จำกัด

เลขทะเบียน ๖-๐๑๑

ที่อก ๐๓๑๐(๑)/ ๑๒๑๒๔

ลงวันที่ ๓๐ ตุลาคม ๒๕๖๓

ขอขยายสารมลพิษที่ได้รับขึ้นทะเบียนจากกรมโรงงานอุตสาหกรรม จำนวน ๓๗๔ รายการ

น้ำเสีย จำนวน 59 รายการ

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
1	Aldicarb	High-Performance Liquid Chromatographic Method <sup>[4]</sup>
2	Aldicarb Sulfone	High-Performance Liquid Chromatographic Method <sup>[4]</sup>
3	Aldicarb Sulfoxide	High-Performance Liquid Chromatographic Method <sup>[4]</sup>
4	Aldrin	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>[4]</sup>
5	Arsenic	1) Digestion, Hydride Generation/Atomic Absorption Spectrometric Method <sup>[4]</sup> 2) Digestion, Inductively Coupled Plasma Method <sup>[4]</sup>
6	Barium	Digestion, Inductively Coupled Plasma Method <sup>[4]</sup>
7	α-BHC	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>[4]</sup>
8	β-BHC	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>[4]</sup>
9	γ-BHC	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>[4]</sup>
10	δ-BHC	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>[4]</sup>
11	Biochemical Oxygen Demand	1) 5-Day BOD Test, Azide Modification Method <sup>[4]</sup> 2) 5-Day BOD Test, Membrane Electrode Method <sup>[4]</sup>
12	Cadmium	1) Digestion, Direct Air-Acetylene Flame Method <sup>[4]</sup> 2) Digestion, Electrothermal Atomic Absorption Spectrometric Method <sup>[4]</sup> 3) Digestion, Inductively Coupled Plasma Method <sup>[4]</sup>
13	Carbaryl	High-Performance Liquid Chromatographic Method <sup>[4]</sup>
14	Carbofuran	High-Performance Liquid Chromatographic Method <sup>[4]</sup>
15	Chemical Oxygen Demand	1) Open Reflux, Titrimetric method <sup>[4]</sup> 2) Closed Reflux, Colorimetric method <sup>[4]</sup> 3) Closed Reflux, Titrimetric Method <sup>[4]</sup>
16	Chlordane	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>[4]</sup>

17 Chromium...



ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
17	Chromium	1) Digestion, Direct Air-Acetylene Flame Method <sup>[4]</sup> 2) Digestion, Electrothermal Atomic Absorption Spectrometric Method <sup>[4]</sup> 3) Digestion, Inductively Coupled Plasma Method <sup>[4]</sup>
18	Color	ADMI Weighted-Ordinate Spectrophotometric Method <sup>[4]</sup>
19	Copper	1) Digestion, Direct Air-Acetylene Flame Method <sup>[4]</sup> 2) Digestion, Inductively Coupled Plasma Method <sup>[4]</sup>
20	Cyanide	Distillation, Colorimetric method <sup>[4]</sup>
21	4,4' DDD	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>[4]</sup>
22	4,4'-DDE	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>[4]</sup>
23	4,4'-DDT	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>[4]</sup>
24	Dieldrin	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>[4]</sup>
25	Endosulfan I	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>[4]</sup>
26	Endosulfan II	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>[4]</sup>
27	Endosulfan Sulfate	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>[4]</sup>
28	Endrin	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>[4]</sup>
29	Endrin aldehyde	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>[4]</sup>
30	Formaldehyde	Distillation, Colorimetric Method <sup>[3]</sup>
31	Free Chlorine	1) Iodometric Method <sup>[4]</sup> 2) DPD Colorimetric Method <sup>[4]</sup>
32	Heptachlor	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>[4]</sup>
33	Heptachlor epoxide	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>[4]</sup>
34	Hexavalent Chromium	Colorimetric Method <sup>[4]</sup>

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
35	3-I hydroxycarbofuran	High-Performance Liquid Chromatographic Method <sup>[4]</sup>
36	Lead	1) Digestion, Direct Air-Acetylene Flame Method <sup>[4]</sup> 2) Digestion, Electrothermal Atomic Absorption Spectrometric Method <sup>[4]</sup> 3) Digestion, Inductively Coupled Plasma Method <sup>[4]</sup>
37	Malathion	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>[4]</sup>
38	Manganese	1) Digestion, Direct Air-Acetylene Flame Method <sup>[4]</sup> 2) Digestion, Inductively Coupled Plasma Method <sup>[4]</sup>
39	Mercury	Digestion, Cold Vapor Atomic Absorption Spectrometric Method <sup>[4]</sup>
40	Methiocarb	High-Performance Liquid Chromatographic Method <sup>[4]</sup>
41	Methomyl	High-Performance Liquid Chromatographic Method <sup>[4]</sup>
42	Methoxychlor	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>[4]</sup>
43	Methyl parathion	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>[4]</sup>
44	1-Naphthol	High-Performance Liquid Chromatographic Method <sup>[4]</sup>
45	Nickel	1) Digestion, Direct Air-Acetylene Flame Method <sup>[4]</sup> 2) Digestion, Inductively Coupled Plasma Method <sup>[4]</sup>
46	Oil & Grease	1) Liquid-Liquid, Partition-Gravimetric Method <sup>[4]</sup> 2) Soxhlet Extraction Method <sup>[4]</sup>
47	Oxamyl	High-Performance Liquid Chromatographic Method <sup>[4]</sup>
48	pH	Electrometric Method <sup>[4]</sup>
49	Phenols	1) Distillation, Chloroform Extraction Method <sup>[4]</sup> 2) Distillation, Direct Photometric Method <sup>[4]</sup>
50	Propoxur	High-Performance Liquid Chromatographic Method <sup>[4]</sup>
51	Selenium	1) Digestion, Hydride Generation/Atomic Absorption Spectrometric Method <sup>[4]</sup> 2) Digestion, Inductively Coupled Plasma Method <sup>[4]</sup>
52	Sulfide	1) Iodometric method <sup>[4]</sup> 2) Methylene blue method <sup>[4]</sup>
53	Temperature	Laboratory and Field Methods <sup>[4]</sup>
54	Total Dissolved Solids	Dried at 180 °C <sup>[4]</sup>
55	Total Kjeldahl Nitrogen	Macro Kjeldahl Method <sup>[4]</sup>

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
56	Total Suspended Solids	Dried at 103-105 °C <sup>[4]</sup>
57	Toxaphene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>[4]</sup>
58	Trivalent Chromium	Digestion, Inductively Coupled Plasma Method; Colorimetric Method; Calculation <sup>[4]</sup>
59	Zinc	1) Digestion, Direct Air-Acetylene Flame Method <sup>[4]</sup> 2) Digestion, Inductively Coupled Plasma Method <sup>[4]</sup>

น้ำใต้ดิน จำนวน 126 รายการ

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
1	Acenaphthene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>[4]</sup>
2	Acetone	Purge and Trap Gas Chromatographic/ Mass Spectrometric Method <sup>[4]</sup>
3	Aldrin	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>[4]</sup>
4	Anthracene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>[4]</sup>
5	Antimony	Digestion, Inductively Coupled Plasma Spectrometric Method <sup>[4]</sup>
6	Arsenic	1) Digestion, Hydride Generation/Atomic Absorption Spectrometric Method <sup>[4]</sup> 2) Digestion, Inductively Coupled Plasma Method <sup>[4]</sup>
7	Atrazine	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>[4]</sup>
8	Barium	Digestion, Inductively Coupled Plasma Spectrometric Method <sup>[4]</sup>
9	Benz(a)anthracene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>[4]</sup>
10	Benzene	Purge and Trap Gas Chromatographic/ Mass Spectrometric Method <sup>[4]</sup>
11	Benzo(b)fluoranthene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>[4]</sup>
12	Benzo(k)fluoranthene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>[4]</sup>

13 Benzoic acid...

13 Benzoic acid...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
13	Benzoic acid	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>[4]</sup>
14	Benzo(a)pyrene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>[4]</sup>
15	Benzo(g,h,i)perylene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>[4]</sup>
16	Beryllium	Digestion, Inductively Coupled Plasma Spectrometric Method <sup>[4]</sup>
17	Bis(2-chloroethyl)ether	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>[4]</sup>
18	Bis(2-ethylhexyl)phthalate	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>[4]</sup>
19	Bromodichloromethane	Purge and Trap Gas Chromatographic/ Mass Spectrometric Method <sup>[4]</sup>
20	Bromoform	Purge and Trap Gas Chromatographic/ Mass Spectrometric Method <sup>[4]</sup>
21	Butanol	Purge and Trap Gas Chromatographic/ Mass Spectrometric Method <sup>[4]</sup>
22	Butyl benzyl phthalate	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>[4]</sup>
23	Cadmium	Digestion, Inductively Coupled Plasma Spectrometric Method <sup>[4]</sup>
24	Carbazole	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>[4]</sup>
25	Carbon disulfide	Purge and Trap Gas Chromatographic/ Mass Spectrometric Method <sup>[4]</sup>
26	Carbon tetrachloride	Purge and Trap Gas Chromatographic/ Mass Spectrometric Method <sup>[4]</sup>
27	Chlordane	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>[4]</sup>
28	p-Chloroaniline	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>[4]</sup>
29	Chlorobenzene	Purge and Trap Gas Chromatographic/ Mass Spectrometric Method <sup>[4]</sup>
30	Chlorodibromomethane	Purge and Trap Gas Chromatographic/ Mass Spectrometric Method <sup>[4]</sup>

1 Chloroform...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
31	Chloroform	Purge and Trap Gas Chromatographic/ Mass Spectrometric Method <sup>[4]</sup>
32	2-Chlorophenol	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>[4]</sup>
33	Chromium	1) Digestion, Direct Air-Acetylene Flame Method <sup>[4]</sup> 2) Digestion, Electrothermal Atomic Absorption Spectrometric Method <sup>[4]</sup> 3) Digestion, Inductively Coupled Plasma Spectrometric Method <sup>[4]</sup>
34	Chromium (III)	Digestion, Inductively Coupled Plasma Spectrometric Method; Colorimetric Method; Calculation <sup>[4]</sup>
35	Chromium (VI)	Colorimetric Method <sup>[4]</sup>
36	Chrysene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>[4]</sup>
37	Cyanide	Distillation, Colorimetric Method <sup>[4]</sup>
38	2,4-D	Liquid-Liquid Extraction, Gas Chromatographic Method <sup>[4]</sup>
39	DDD	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>[4]</sup>
40	DDE	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>[4]</sup>
41	DNT	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>[4]</sup>
42	Dibenz(a,h)anthracene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>[4]</sup>
43	Di-n-butyl phthalate	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>[4]</sup>
44	1,2-Dichlorobenzene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>[4]</sup>
45	1,3-Dichlorobenzene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>[4]</sup>
46	1,4-Dichlorobenzene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>[4]</sup>
47	3,3'-Dichlorobenzidine	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>[4]</sup>

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
48	1,1-Dichloroethane	Purge and Trap Gas Chromatographic/ Mass Spectrometric Method <sup>[4]</sup>
49	1,2-Dichloroethane	Purge and Trap Gas Chromatographic/ Mass Spectrometric Method <sup>[4]</sup>
50	1,1-Dichloroethylene	Purge and Trap Gas Chromatographic/ Mass Spectrometric Method <sup>[4]</sup>
51	cis-1,2-Dichloroethylene	Purge and Trap Gas Chromatographic/ Mass Spectrometric Method <sup>[4]</sup>
52	trans 1,2 Dichloroethylene	Purge and Trap Gas Chromatographic/ Mass Spectrometric Method <sup>[4]</sup>
53	2,4-Dichlorophenol	Liquid Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>[4]</sup>
54	1,2-Dichloropropane	Purge and Trap Gas Chromatographic/ Mass Spectrometric Method <sup>[4]</sup>
55	1,3-Dichloropropane	Purge and Trap Gas Chromatographic/ Mass Spectrometric Method <sup>[4]</sup>
56	1,3-Dichloropropene	Purge and Trap Gas Chromatographic/ Mass Spectrometric Method <sup>[4]</sup>
57	Dieldrin	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>[4]</sup>
58	Diethyl phthalate	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>[4]</sup>
59	2,4-Dimethylphenol	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>[4]</sup>
60	2,4-Dinitrophenol	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>[4]</sup>
61	2,4-Dinitrotoluene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>[4]</sup>
62	2,6-Dinitrotoluene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>[4]</sup>
63	Di-n-Octyl phthalate	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>[4]</sup>
64	Endosulfan	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>[4]</sup>
65	Endrin	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>[4]</sup>



ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
66	Ethylbenzene	Purge and Trap Gas Chromatographic/ Mass Spectrometric Method <sup>[4]</sup>
67	Fluoranthene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>[4]</sup>
68	Fluorene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>[4]</sup>
69	Heptachlor	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>[4]</sup>
70	Heptachlor epoxide	Liquid Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>[4]</sup>
71	Hexachlorobenzene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>[4]</sup>
72	Hexachloro-1,3-butadiene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>[4]</sup>
73	n-Hexane	Purge and Trap Gas Chromatographic/ Mass Spectrometric Method <sup>[4]</sup>
74	$\alpha$ -HCH	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>[4]</sup>
75	$\beta$ -HCH	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>[4]</sup>
76	$\gamma$ -HCH	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>[4]</sup>
77	Hexachlorocyclopentadiene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>[4]</sup>
78	Hexachloroethane	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>[4]</sup>
79	Indeno(1,2,3-cd)pyrene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>[4]</sup>
80	Isophorone	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>[4]</sup>
81	Lead	1) Digestion, Direct Air-Acetylene Flame Method <sup>[4]</sup> 2) Digestion, Electrothermal Atomic Absorption Spectrometric Method <sup>[4]</sup> 3) Digestion, Inductively Coupled Plasma Spectrometric Method <sup>[4]</sup>
82	Manganese	1) Digestion, Direct Air-Acetylene Flame Method <sup>[4]</sup>

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
		2) Digestion, Inductively Coupled Plasma Spectrometric Method <sup>[4]</sup>
83	Mercury	Digestion, Cold-Vapor Atomic Absorption Spectrometric Method <sup>[4]</sup>
84	Methanol	Purge and Trap Gas Chromatographic/ Mass Spectrometric Method <sup>[4]</sup>
85	Methoxychlor	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>[4]</sup>
86	Methyl bromide	Purge and Trap Gas Chromatographic/ Mass Spectrometric Method <sup>[4]</sup>
87	Methylene chloride	Purge and Trap Gas Chromatographic/ Mass Spectrometric Method <sup>[4]</sup>
88	2-Methylphenol	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>[4]</sup>
89	2 Methyl-naphthalene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>[4]</sup>
90	Methyl tert-butyl ether	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>[4]</sup>
91	Naphthalene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>[4]</sup>
92	Nickel	1) Digestion, Direct Air-Acetylene Flame Method <sup>[4]</sup> 2) Digestion, Inductively Coupled Plasma Spectrometric Method <sup>[4]</sup>
93	Nitrobenzene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>[4]</sup>
94	N-Nitrosodiphenylamine	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>[4]</sup>
95	N-Nitrosodi-n-propylamine	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>[4]</sup>
96	Polychlorinated Biphenyls - PCB-1016 - PCB-1221 - PCB-1232 - PCB-1242 - PCB-1248 - PCB-1254 - PCB-1260	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>[4]</sup>

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
97	Pentachlorophenol	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>[4]</sup>
98	pH	Electrometric method <sup>[4]</sup>
99	Phenanthrene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>[4]</sup>
100	Phenol	1) Distillation, Chloroform Extraction Method <sup>[4]</sup> 2) Distillation, Direct Photometric Method <sup>[4]</sup>
101	Pyrene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>[4]</sup>
102	Selenium	Digestion, Hydride Generation/Atomic Absorption Spectrometric Method <sup>[4]</sup>
103	Silver	Digestion, Inductively Coupled Plasma Method <sup>[4]</sup>
104	Styrene	Purge and Trap Gas Chromatographic/ Mass spectrometric Method <sup>[4]</sup>
105	1,1,2,2 Tetrachloroethane	Purge and Trap Gas Chromatographic/ Mass Spectrometric Method <sup>[4]</sup>
106	Tetrachloroethylene	Purge and Trap Gas Chromatographic/ Mass Spectrometric Method <sup>[4]</sup>
107	Toluene	Purge and Trap Gas Chromatographic/ Mass Spectrometric Method <sup>[4]</sup>
108	Toxaphene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>[4]</sup>
109	TPH (C <sub>5</sub> -C <sub>6</sub> )	Purge and Trap, Gas Chromatographic Method <sup>[12,21]</sup>
110	TPH (C <sub>8</sub> -C <sub>16</sub> )	Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic Method <sup>[9,21]</sup>
111	TPH (C <sub>16</sub> -C <sub>35</sub> )	Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic Method <sup>[9,21]</sup>
112	1,2,4-Trichlorobenzene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>[4]</sup>
113	1,1,1-Trichloroethane	Purge and Trap Gas Chromatographic/ Mass Spectrometric Method <sup>[4]</sup>
114	1,1,2-Trichloroethane	Purge and Trap Gas Chromatographic/ Mass Spectrometric Method <sup>[4]</sup>
115	Trichloroethylene	Purge and Trap Gas Chromatographic/ Mass Spectrometric Method <sup>[4]</sup>
116	2,4,5-Trichlorophenol	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>[4]</sup>

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
117	2,4,6-Trichlorophenol	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>[4]</sup>
118	1,3,5-Trimethylbenzene	Purge and Trap Gas Chromatographic/ Mass Spectrometric Method <sup>[4]</sup>
119	Vanadium	Digestion, Inductively Coupled Plasma Spectrometric Method <sup>[4]</sup>
120	Vinyl acetate	Purge and Trap Gas Chromatographic/ Mass Spectrometric Method <sup>[4]</sup>
121	Vinyl chloride	Purge and Trap Gas Chromatographic/ Mass Spectrometric Method <sup>[4]</sup>
122	m-Xylene	Purge and Trap Gas Chromatographic/ Mass Spectrometric Method <sup>[4]</sup>
123	o-Xylene	Purge and Trap Gas Chromatographic/ Mass Spectrometric Method <sup>[4]</sup>
124	p-Xylene	Purge and Trap Gas Chromatographic/ Mass Spectrometric Method <sup>[4]</sup>
125	Xylene (Total)	Purge and Trap Gas Chromatographic/ Mass Spectrometric Method <sup>[4]</sup>
126	Zinc	1) Digestion, Direct Air Acetylene Flame Method <sup>[4]</sup> 2) Digestion, Inductively Coupled Plasma Spectrometric Method <sup>[4]</sup>

**อากาศเสีย (ปล่อยระบาย) จำนวน 28 รายการ**

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
1	Antimony	1) Isokinetic Sampling, Digestion, Direct Air-Acetylene Flame Method <sup>[5]</sup> 2) Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method <sup>[5]</sup>
2	Arsenic	1) Isokinetic Sampling, Digestion, Hydride Generation/Atomic Absorption Spectrometric Method <sup>[5]</sup> 2) Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method <sup>[5]</sup>
3	Beryllium	Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method <sup>[5]</sup>

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
4	Cadmium	1) Isokinetic Sampling, Digestion, Direct Air-Acetylene Flame Method <sup>[5]</sup> 2) Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method <sup>[5]</sup>
5	Carbon Monoxide	Instrumental Analyzer Method <sup>[5]</sup>
6	Chlorine	1) Absorption Sampling, Ion Chromatographic Method <sup>[5]</sup> 2) Isokinetic Sampling, Ion Chromatographic Method <sup>[5]</sup>
7	Chromium	1) Isokinetic Sampling, Digestion, Direct Air-Acetylene Flame Method <sup>[5]</sup> 2) Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method <sup>[5]</sup>
8	Cobalt	1) Isokinetic Sampling, Digestion, Direct Air-Acetylene Flame Method <sup>[5]</sup> 2) Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method <sup>[5]</sup>
9	Copper	1) Isokinetic Sampling, Digestion, Direct Air-Acetylene Flame Method <sup>[5]</sup> 2) Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method <sup>[5]</sup>
10	Cresol	Adsorption Sampling, Gas Chromatographic Method <sup>[5]</sup>
11	Dioxins/Furans	Isokinetic Sampling, Analysis by ISO/IEC 17025 Accredited Laboratory or Analysis by Department of Industrial Works Registered Laboratory (Dioxins/Furans Analysis Approved) <sup>[5]</sup>
12	Hydrogen Chloride	1) Absorption Sampling, Ion Chromatographic Method <sup>[5]</sup> 2) Isokinetic Sampling, Ion Chromatographic Method <sup>[5]</sup>
13	Hydrogen Fluoride	1) Absorption Sampling, Ion Chromatographic Method <sup>[5]</sup> 2) Isokinetic Sampling, Ion Chromatographic Method <sup>[5]</sup>
14	Hydrogen Sulfide	Absorption Sampling, Iodometric Method <sup>[5]</sup>
15	Lead	1) Isokinetic Sampling, Digestion, Direct Air-Acetylene Flame Method <sup>[5]</sup>

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
16	Manganese	2) Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method <sup>[5]</sup> 1) Isokinetic Sampling, Digestion, Direct Air-Acetylene Flame Method <sup>[5]</sup> 2) Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method <sup>[5]</sup>
17	Mercury	Isokinetic Sampling, Digestion, Cold-Vapor Atomic Absorption Spectrometric Method <sup>[5]</sup>
18	Nickel	1) Isokinetic Sampling, Digestion, Direct Air-Acetylene Flame Method <sup>[5]</sup> 2) Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method <sup>[5]</sup>
19	Opacity	Ringelmann's Method <sup>[2]</sup>
20	Oxides of Nitrogen	1) Absorption Sampling, Phenoldisulfonic acid Method <sup>[5]</sup> 2) Instrumental Analyzer Method <sup>[5]</sup>
21	Selenium	Isokinetic Sampling, Digestion, Hydride Generation/Atomic Absorption Spectrometric Method <sup>[5]</sup>
22	Sulfur Dioxide	1) Absorption Sampling, Barium-Thorin Titrimetric Method <sup>[5]</sup> 2) Isokinetic Sampling, Barium-Thorin Titrimetric Method <sup>[5]</sup> 3) Instrumental Analyzer Method <sup>[5]</sup>
23	Sulfuric acid	Isokinetic Sampling, Barium-Thorin Titrimetric Method <sup>[5]</sup>
24	Tellurium	Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method <sup>[5]</sup>
25	Tin	Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method <sup>[5]</sup>
26	Total Suspended Particulate	Isokinetic Sampling, Gravimetric Method <sup>[5]</sup>
27	Vanadium	Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method <sup>[5]</sup>
28	Xylene	1) Adsorption Sampling, Gas Chromatographic Method <sup>[5]</sup> 2) Adsorption Sampling, Gas Chromatographic/Mass Spectrometric Method <sup>[5]</sup>



## สิ่งปลูกหรือวัสดุที่ไม่ใช่แล้ว จำนวน 36 รายการ

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
1	Acrylonitrile	1) Waste Extraction, Purge and Trap, Gas Chromatographic/Mass Spectrometric Method <sup>[1,12,26]</sup>
2	Aldrin	2) Purge and Trap, Gas Chromatographic/Mass Spectrometric Method <sup>[13,26]</sup> 1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic Method <sup>[1,9,22]</sup> 2) Soxhlet Extraction, Gas Chromatographic Method <sup>[10,22]</sup>
3	Antimony	1) Waste Extraction, Digestion, Flame Atomic Absorption Spectrometric Method <sup>[1,6,15]</sup> 2) Waste Extraction, Digestion, Inductively Coupled Plasma Method <sup>[1,6,14]</sup> 3) Digestion, Flame Atomic Absorption Spectrometric Method <sup>[7,15]</sup> 4) Digestion, Inductively Coupled Plasma Method <sup>[7,14]</sup>
4	Arsenic	1) Waste Extraction, Digestion, Hydride Generation/Atomic Absorption Spectrometric Method <sup>[1,6,16]</sup> 2) Waste Extraction, Digestion, Inductively Coupled Plasma Method <sup>[1,6,14]</sup> 3) Digestion, Hydride Generation/Atomic Absorption Spectrometric Method <sup>[7,16]</sup> 4) Digestion, Inductively Coupled Plasma Method <sup>[7,14]</sup>
5	Barium	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method <sup>[1,6,14]</sup> 2) Digestion, Inductively Coupled Plasma Method <sup>[7,14]</sup>
6	Beryllium	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method <sup>[1,6,14]</sup> 2) Digestion, Inductively Coupled Plasma Method <sup>[7,14]</sup>
7	Cadmium	1) Waste Extraction, Digestion, Flame Atomic Absorption Spectrometric Method <sup>[1,6,15]</sup> 2) Waste Extraction, Digestion, Inductively Coupled Plasma Method <sup>[1,6,14]</sup>

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
8	Chlordane	3) Digestion, Flame Atomic Absorption Spectrometric Method <sup>[7,15]</sup> 4) Digestion, Inductively Coupled Plasma Method <sup>[7,14]</sup> 1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>[1,9,27]</sup> 2) Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>[10,27]</sup>
9	Chromium	1) Waste Extraction, Digestion, Flame Atomic Absorption Spectrometric Method <sup>[1,6,15]</sup> 2) Waste Extraction, Digestion, Inductively Coupled Plasma Method <sup>[1,6,14]</sup> 3) Digestion, Flame Atomic Absorption Spectrometric Method <sup>[7,15]</sup> 4) Digestion, Inductively Coupled Plasma Method <sup>[7,14]</sup>
10	Chromium (VI)	1) Waste Extraction, Colorimetric Method <sup>[1,17]</sup> 2) Alkaline Digestion, Colorimetric Method <sup>[8,17]</sup>
11	Cobalt	1) Waste Extraction, Digestion, Flame Atomic Absorption Spectrometric Method <sup>[1,6,15]</sup> 2) Waste Extraction, Digestion, Inductively Coupled Plasma Method <sup>[1,6,14]</sup> 3) Digestion, Flame Atomic Absorption Spectrometric Method <sup>[7,15]</sup> 4) Digestion, Inductively Coupled Plasma Method <sup>[7,14]</sup>
12	Copper	1) Waste Extraction, Digestion, Flame Atomic Absorption Spectrometric Method <sup>[1,6,15]</sup> 2) Waste Extraction, Digestion, Inductively Coupled Plasma Method <sup>[1,6,14]</sup> 3) Digestion, Flame Atomic Absorption Spectrometric Method <sup>[7,15]</sup> 4) Digestion, Inductively Coupled Plasma Method <sup>[7,14]</sup>
13	2,4-D	1) Waste Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>[1,25]</sup> 2) Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>[25]</sup>

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
14	DDD	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic Method <sup>[1,9,22]</sup> 2) Soxhlet Extraction, Gas Chromatographic Method <sup>[10,22]</sup>
15	DDE	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic Method <sup>[1,9,22]</sup> 2) Soxhlet Extraction, Gas Chromatographic Method <sup>[10,22]</sup>
16	DDT	1) Waste Extraction, Separatory Funnel Liquid Liquid Extraction, Gas Chromatographic Method <sup>[1,9,22]</sup> 2) Soxhlet Extraction, Gas Chromatographic Method <sup>[10,22]</sup>
17	Dieldrin	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic Method <sup>[1,9,22]</sup> 2) Soxhlet Extraction, Gas Chromatographic Method <sup>[10,22]</sup>
18	Endrin	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic Method <sup>[1,9,22]</sup> 2) Soxhlet Extraction, Gas Chromatographic Method <sup>[10,22]</sup>
19	Heptachlor	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic Method <sup>[1,9,22]</sup> 2) Soxhlet Extraction, Gas Chromatographic Method <sup>[10,22]</sup>
20	Lead	1) Waste Extraction, Digestion, Flame Atomic Absorption Spectrometric Method <sup>[1,6,15]</sup> 2) Waste Extraction, Digestion, Inductively Coupled Plasma Method <sup>[1,6,14]</sup> 3) Digestion, Flame Atomic Absorption Spectrometric Method <sup>[7,15]</sup> 4) Digestion, Inductively Coupled Plasma Method <sup>[7,14]</sup>
21	Lindane	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>[1,9,27]</sup> 2) Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>[10,27]</sup>

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
22	Mercury	1) Waste Extraction, Digestion, Cold-Vapor Atomic Absorption Spectrometric Method <sup>[1,18]</sup> 2) Digestion, Cold-Vapor Atomic Absorption Spectrometric Method <sup>[19]</sup>
23	Methoxychlor	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic Method <sup>[1,9,22]</sup> 2) Soxhlet Extraction, Gas Chromatographic Method <sup>[10,22]</sup>
24	Molybdenum	1) Waste Extraction, Digestion, Flame Atomic Absorption Spectrometric Method <sup>[1,6,15]</sup> 2) Waste Extraction, Digestion, Inductively Coupled Plasma Method <sup>[1,6,14]</sup> 3) Digestion, Flame Atomic Absorption Spectrometric Method <sup>[7,15]</sup> 4) Digestion, Inductively Coupled Plasma Method <sup>[7,14]</sup>
25	Nickel	1) Waste Extraction, Digestion, Flame Atomic Absorption Spectrometric Method <sup>[1,6,15]</sup> 2) Waste Extraction, Digestion, Inductively Coupled Plasma Method <sup>[1,6,14]</sup> 3) Digestion, Flame Atomic Absorption Spectrometric Method <sup>[7,15]</sup> 4) Digestion, Inductively Coupled Plasma Method <sup>[7,14]</sup>
26	Polychlorinated Biphenyls - Aroclor 1016 - Aroclor 1221 - Aroclor 1232 - Aroclor 1242 - Aroclor 1248 - Aroclor 1254 - Aroclor 1260	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>[1,9,27]</sup> 2) Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>[10,27]</sup>
27	Pentachlorophenol	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic Method <sup>[1,9,22]</sup> 2) Soxhlet Extraction, Gas Chromatographic Method <sup>[10,22]</sup>
28	pH	Electrometric Method <sup>[31,32]</sup>



ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
29	Selenium	1) Waste Extraction, Digestion, Hydride Generation/Atomic Absorption Spectrometric Method <sup>[1,6,20]</sup> 2) Waste Extraction, Digestion, Inductively Coupled Plasma Method <sup>[1,6,14]</sup> 3) Digestion, Hydride Generation/Atomic Absorption Spectrometric Method <sup>[7,20]</sup> 4) Digestion, Inductively Coupled Plasma Method <sup>[7,14]</sup>
30	Silver	1) Waste Extraction, Digestion, Flame Atomic Absorption Spectrometric Method <sup>[1,6,15]</sup> 2) Waste Extraction, Digestion, Inductively Coupled Plasma Method <sup>[1,6,14]</sup> 3) Digestion, Flame Atomic Absorption Spectrometric Method <sup>[7,15]</sup> 4) Digestion, Inductively Coupled Plasma Method <sup>[7,14]</sup>
31	Silvex	1) Waste Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>[1,25]</sup> 2) Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>[25]</sup>
32	Thallium	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method <sup>[1,6,14]</sup> 2) Digestion, Inductively Coupled Plasma Method <sup>[7,14]</sup>
33	Toxaphene	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>[1,9,27]</sup> 2) Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>[10,27]</sup>
34	Trichloroethylene	1) Waste Extraction, Purge and Trap, Gas Chromatographic/Mass Spectrometric Method <sup>[1,12,26]</sup> 2) Purge and Trap, Gas Chromatographic/Mass Spectrometric Method <sup>[13,26]</sup>
35	Vanadium	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method <sup>[1,6,14]</sup> 2) Digestion, Inductively Coupled Plasma Method <sup>[7,14]</sup>

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
36	Zinc	1) Waste Extraction, Digestion, Flame Atomic Absorption Spectrometric Method <sup>[1,6,15]</sup> 2) Waste Extraction, Digestion, Inductively Coupled Plasma Method <sup>[1,6,14]</sup> 3) Digestion, Flame Atomic Absorption Spectrometric Method <sup>[7,15]</sup> 4) Digestion, Inductively Coupled Plasma Method <sup>[7,14]</sup>

## ดิน จำนวน 125 รายการ

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
1	Acenaphthene	Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>[10,27]</sup>
2	Acetone	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method <sup>[13,26]</sup>
3	Aldrin	Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>[10,27]</sup>
4	Anthracene	Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>[10,27]</sup>
5	Antimony	1) Digestion, Flame Atomic Absorption Spectrometric Method <sup>[7,15]</sup> 2) Digestion, Inductively Coupled Plasma Method <sup>[7,14]</sup>
6	Arsenic	1) Digestion, Hydride Generation/Atomic Absorption Spectrometric Method <sup>[7,16]</sup> 2) Digestion, Inductively Coupled Plasma Method <sup>[7,14]</sup>
7	Atrazine	Soxhlet Extraction, Gas Chromatographic Method <sup>[10,24]</sup>
8	Barium	Digestion, Inductively Coupled Plasma Method <sup>[7,14]</sup>
9	Benz(a)anthracene	Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>[10,27]</sup>
10	Benzene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method <sup>[13,26]</sup>
11	Benzo(b)fluoranthene	Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>[10,27]</sup>
12	Benzo(k)fluoranthene	Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method <sup>[10,27]</sup>

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
13	Benzoic acid	Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>[10,27]</sup>
14	Benzo(a)pyrene	Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>[10,27]</sup>
15	Benzo(g,h,i)perylene	Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>[10,27]</sup>
16	Beryllium	Digestion, Inductively Coupled Plasma Method <sup>[7,14]</sup>
17	Bis(2-chloroethyl)ether	Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>[10,27]</sup>
18	Bis(2 ethylhexyl)phthalate	Soxhlet Extraction, Gas Chromatographic Method <sup>[10,23]</sup>
19	Bromodichloromethane	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>[13,26]</sup>
20	Bromoform	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>[13,26]</sup>
21	Butanol	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>[13,26]</sup>
22	Butyl benzyl phthalate	Soxhlet Extraction, Gas Chromatographic Method <sup>[10,23]</sup>
23	Cadmium	1) Digestion, Flame Atomic Absorption Spectrometric Method <sup>[7,15]</sup> 2) Digestion, Inductively Coupled Plasma Method <sup>[7,14]</sup>
24	Carbazole	Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>[10,27]</sup>
25	Carbon disulfide	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>[13,26]</sup>
26	Carbon tetrachloride	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>[13,26]</sup>
27	Chlordane	Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>[10,27]</sup>
28	p-Chloroaniline	Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>[10,27]</sup>
29	Chlorobenzene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>[13,26]</sup>
30	Chlorodibromomethane	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>[13,26]</sup>
31	Chloroform	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>[13,26]</sup>

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
32	2-Chlorophenol	Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>[10,27]</sup>
33	Chromium	1) Digestion, Flame Atomic Absorption Spectrometric Method <sup>[7,15]</sup> 2) Digestion, Inductively Coupled Plasma Method <sup>[7,6010]</sup>
34	Chromium (III)	Digestion, Inductively Coupled Plasma Method; Alkaline Digestion Colorimetric Method; Calculation Method <sup>[7,8,14,17]</sup>
35	Chromium (VI)	Alkaline Digestion, Colorimetric Method <sup>[8,17]</sup>
36	Chrysene	Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>[10,27]</sup>
37	Cyanide	Extraction, Distillation, Colorimetric Method <sup>[28,29,30]</sup>
38	2,4-D	Ultrasonic Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>[25]</sup>
39	DDD	Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>[10,27]</sup>
40	DDE	Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>[10,27]</sup>
41	DDT	Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>[10,27]</sup>
42	Dibenz(a,h)anthracene	Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>[10,27]</sup>
43	Di-n-butyl phthalate	Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>[10,27]</sup>
44	1,2-Dichlorobenzene	Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>[10,27]</sup>
45	1,3-Dichlorobenzene	Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>[10,27]</sup>
46	1,4-Dichlorobenzene	Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>[10,27]</sup>
47	3,3'-Dichlorobenzidine	Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>[10,27]</sup>
48	1,1-Dichloroethane	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>[13,26]</sup>

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
49	1,2-Dichloroethane	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>[13,26]</sup>
50	1,1-Dichloroethylene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>[13,26]</sup>
51	cis-1,2-Dichloroethylene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>[13,26]</sup>
52	trans-1,2-Dichloroethylene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>[13,26]</sup>
53	2,4-Dichlorophenol	Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>[10,27]</sup>
54	1,2-Dichloropropane	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>[13,26]</sup>
55	1,3 Dichloropropane	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>[13,26]</sup>
56	1,3-Dichloropropene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>[13,26]</sup>
57	Dieldrin	Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>[10,27]</sup>
58	Diethyl phthalate	Soxhlet Extraction, Gas Chromatographic Method <sup>[10,23]</sup>
59	2,4-Dimethylphenol	Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>[10,27]</sup>
60	2,4-Dinitrophenol	Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>[10,27]</sup>
61	2,4-Dinitrotoluene	Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>[10,27]</sup>
62	2,6-Dinitrotoluene	Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>[10,27]</sup>
63	Di-n-Octyl phthalate	Soxhlet Extraction, Gas Chromatographic Method <sup>[10,23]</sup>
64	Endosulfan	Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>[10,27]</sup>
65	Endrin	Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>[10,27]</sup>
66	Ethylbenzene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>[13,26]</sup>
67	Fluoranthene	Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>[10,27]</sup>

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
68	Fluorene	Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>[10,27]</sup>
69	Heptachlor	Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>[10,27]</sup>
70	Heptachlor epoxide	Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>[10,27]</sup>
71	Hexachlorobenzene	Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>[10,27]</sup>
72	Hexachloro 1,3 butadiene	Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>[10,27]</sup>
73	n-Hexane	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>[13,26]</sup>
74	$\alpha$ -HCH	Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>[10,27]</sup>
75	$\beta$ -HCH	Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>[10,27]</sup>
76	$\gamma$ -HCH	Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>[10,27]</sup>
77	Hexachlorocyclopentadiene	Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>[10,27]</sup>
78	Hexachloroethane	Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>[10,27]</sup>
79	Indeno(1,2,3-cd)pyrene	Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>[10,27]</sup>
80	Isophorone	Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>[10,27]</sup>
81	Lead	1) Digestion, Flame Atomic Absorption Spectrometric Method <sup>[7,15]</sup>
82	Manganese	2) Digestion, Inductively Coupled Plasma Method <sup>[7,14]</sup> 1) Digestion, Flame Atomic Absorption Spectrometric Method <sup>[7,15]</sup>
83	Mercury	2) Digestion, Inductively Coupled Plasma Method <sup>[7,14]</sup> Digestion, Cold-Vapor Atomic Absorption Spectrometric Method <sup>[19]</sup>
84	Methanol	Equilibrium Headspace, Gas chromatographic Method <sup>[11,21]</sup>



ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
85	Methoxychlor	Soxhlet Extraction, Gas Chromatographic Method <sup>[10,22]</sup>
86	Methyl bromide	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>[13,26]</sup>
87	Methylene chloride	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>[13,26]</sup>
88	2 Methylphenol	Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>[10,27]</sup>
89	2-Methylnaphthalene	Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>[10,27]</sup>
90	Methyl tert-butyl ether	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>[13,26]</sup>
91	Naphthalene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>[13,26]</sup>
92	Nickel	1) Digestion, Flame Atomic Absorption Spectrometric Method <sup>[7,15]</sup> 2) Digestion, Inductively Coupled Plasma Method <sup>[7,14]</sup>
93	Nitrobenzene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>[13,26]</sup>
94	N-Nitrosodiphenylamine	Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>[10,27]</sup>
95	N-Nitrosodi-n-propylamine	Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>[10,27]</sup>
96	Polychlorinated Biphenyls - Aroclor 1016 - Aroclor 1221 - Aroclor 1232 - Aroclor 1242 - Aroclor 1248 - Aroclor 1254 - Aroclor 1260	Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>[10,27]</sup>
97	Pentachlorophenol	Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>[10,27]</sup>
98	Phenanthrene	Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>[10,27]</sup>
99	Phenol	Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>[10,27]</sup>

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
100	Pyrene	Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>[10,27]</sup>
101	Selenium	Digestion, Hydride Generation/Atomic Absorption Spectrometric Method <sup>[7,20]</sup>
102	Silver	Digestion, Inductively Coupled Plasma Method <sup>[7,14]</sup>
103	Styrene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>[13,26]</sup>
104	1,1,2,2-Tetrachloroethane	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>[13,26]</sup>
105	Tetrachloroethylene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>[13,26]</sup>
106	Toluene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>[13,26]</sup>
107	Toxaphene	Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>[10,27]</sup>
108	TPH (C <sub>5</sub> -C <sub>8</sub> )	Purge and Trap, Gas Chromatographic Method <sup>[13,21]</sup>
109	TPH (C <sub>8</sub> -C <sub>16</sub> )	Soxhlet Extraction, Gas Chromatographic Method <sup>[10,21]</sup>
110	TPH (C <sub>16</sub> -C <sub>35</sub> )	Soxhlet Extraction, Gas Chromatographic Method <sup>[10,21]</sup>
111	1,2,4-Trichlorobenzene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>[13,26]</sup>
112	1,1,1-Trichloroethane	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>[13,26]</sup>
113	1,1,2-Trichloroethane	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>[13,26]</sup>
114	Trichloroethylene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>[13,26]</sup>
115	2,4,5-Trichlorophenol	Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>[10,27]</sup>
116	2,4,6-Trichlorophenol	Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method <sup>[10,27]</sup>
117	1,3,5-Trimethylbenzene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>[13,26]</sup>
118	Vanadium	Digestion, Inductively Coupled Plasma Method <sup>[7,14]</sup>
119	Vinyl acetate	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>[13,26]</sup>

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
120	Vinyl chloride	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>[13,26]</sup>
121	m-Xylene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>[13,26]</sup>
122	o-Xylene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>[13,26]</sup>
123	p-Xylene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>[13,26]</sup>
124	Xylene (Total)	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method <sup>[13,26]</sup>
125	Zinc	1) Digestion, Flame Atomic Absorption Spectrometric Method <sup>[7,15]</sup> 2) Digestion, Inductively Coupled Plasma Method <sup>[7,14]</sup>

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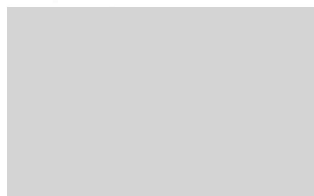
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มสพช



ที่ อก ๐๓๑๐(๑)/ ๕๑๓๓



กรมโรงงานอุตสาหกรรม  
ถนนพระรามที่ ๖ แขวงทุ่งพญาไท  
เขตราชเทวี กรุงเทพฯ ๑๐๔๐๐

๑๑ พฤษภาคม ๒๕๖๕

เรื่อง เปลี่ยนแปลงบุคลากรของห้องปฏิบัติการวิเคราะห์

เรียน กรรมการผู้จัดการ บริษัท เอส.พี.เอส. คอนสตรัคชั่น เซอร์วิส จำกัด

อ้างถึง ๑) คำขอขึ้นทะเบียน/ต่ออายุ/เปลี่ยนแปลงบุคลากร และชนิดสารมลพิษของห้องปฏิบัติการวิเคราะห์เอกชน  
ลงวันที่ ๓๐ มีนาคม ๒๕๖๔

๒) หนังสือกรมโรงงานอุตสาหกรรม ที่ อก ๐๓๑๐(๑)/๔๗๕๒ ลงวันที่ ๒๖ เมษายน ๒๕๖๔

ตามหนังสือที่อ้างถึง ๑ บริษัท เอส.พี.เอส. คอนสตรัคชั่น เซอร์วิส จำกัด ห้องปฏิบัติการวิเคราะห์  
เอกชน เลขทะเบียน ว-๐๑๑ สถานที่ตั้งเลขที่ ๗ ซอยพหลโยธิน ๒๔ ถนนพหลโยธิน แขวงจอมพล เขตจตุจักร  
กรุงเทพมหานคร ขอเปลี่ยนแปลงบุคลากรของห้องปฏิบัติการวิเคราะห์ ความละเอียดแจ้งแล้ว นั้น

กรมโรงงานอุตสาหกรรมได้ส่งหนังสือเปลี่ยนแปลงบุคลากรของห้องปฏิบัติการวิเคราะห์  
ที่ อก ๐๓๑๐(๑)/๔๗๕๒ ลงวันที่ ๒๖ เมษายน ๒๕๖๔ ตามหนังสือที่อ้างถึง ๒ และได้ตรวจสอบพบ  
ความคลาดเคลื่อนจึงขอยกเลิกหนังสือฉบับดังกล่าว โดยให้บริษัท เอส.พี.เอส. คอนสตรัคชั่น เซอร์วิส จำกัด  
ใช้หนังสือเปลี่ยนแปลงบุคลากรของห้องปฏิบัติการวิเคราะห์ฉบับนี้แทน ดังนี้

-๒-

อนึ่ง หนังสือฉบับนี้จะหมดอายุพร้อมหนังสือรับต่ออายุขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์  
เอกชน ที่ อก ๐๓๑๐(๑)/๑๒๑๒๔ ลงวันที่ ๓๐ ตุลาคม ๒๕๖๓ คือในวันที่ ๓๐ กรกฎาคม ๒๕๖๖

จึงเรียนมาเพื่อทราบ

ขอแสดงความนับถือ

กองวิจัยและเตือนภัยมลพิษโรงงาน

กลุ่มมาตรฐานวิธีการวิเคราะห์ทดสอบมลพิษและทะเบียนห้องปฏิบัติการ

โทร. ๐ ๒๒๐๒ ๔๑๔๖ ๐ ๒๒๐๒ ๔๐๐๒

โทรสาร ๐ ๒๓๕๔ ๓๔๑๕



ที่ อก ๐๓๑๐(๑)/ ๑ ๑ ๒๓๗



กรมโรงงานอุตสาหกรรม  
ถนนพระรามที่ ๖ แขวงทุ่งพญาไท  
เขตราชเทวี กรุงเทพฯ ๑๐๔๐๐

#### ๑๔ พฤศจิกายน ๒๕๖๔

เรื่อง เปลี่ยนแปลงบุคลากรของห้องปฏิบัติการวิเคราะห์

เรียน กรรมการผู้จัดการ บริษัท เอส.พี.เอส. คอนสตรัคชั่น เซอร์วิส จำกัด

อ้างถึง คำขอขึ้นทะเบียน/ต่ออายุ/เปลี่ยนแปลงบุคลากร และชนิดสารมลพิษของห้องปฏิบัติการวิเคราะห์เอกชน  
ลงวันที่ ๑๕ ตุลาคม ๒๕๖๔

ตามหนังสือที่อ้างถึง บริษัท เอส.พี.เอส. คอนสตรัคชั่น เซอร์วิส จำกัด ห้องปฏิบัติการวิเคราะห์เอกชน  
เลขทะเบียน ว-๐๑๑ สถานที่ตั้งเลขที่ ๗ ซอยพหลโยธิน ๒๔ ถนนพหลโยธิน แขวงจอมพล เขตจตุจักร  
กรุงเทพมหานคร ขอเปลี่ยนแปลงบุคลากรของห้องปฏิบัติการวิเคราะห์ ความละเอียดแจ้งแล้ว นั้น

๔. ให้เพิ่มเจ้าหน้าที่...

- ๒ -

ที่ อก ๐๓๑๐(๑)/๑๒๑๒๔ ลงวันที่ ๓๐ ตุลาคม ๒๕๖๓ คือในวันที่ ๓๐ กรกฎาคม ๒๕๖๖

จึงเรียนมาเพื่อทราบ

กองวิจัยและเตือนภัยมลพิษโรงงาน  
กลุ่มมาตรฐานวิธีการวิเคราะห์ทดสอบมลพิษและทะเบียนห้องปฏิบัติการ  
โทร. ๐ ๒๔๓๐ ๖๓๑๒ ต่อ ๒๑๐๓-๕  
โทรสาร ๐ ๒๔๓๐ ๖๓๑๒ ต่อ ๒๑๙๙  
ไปรษณีย์อิเล็กทรอนิกส์ saraban@dlw.mail.go.th



ที่ อก ๐๓๑๐(๑)/ ๔๔๘ ๑



กรมโรงงานอุตสาหกรรม  
ถนนพระรามที่ ๖ แขวงทุ่งพญาไท  
เขตราชเทวี กรุงเทพฯ ๑๐๔๐๐

๓๑ มีนาคม ๒๕๖๕

เรื่อง เปลี่ยนแปลงบุคลากรของห้องปฏิบัติการวิเคราะห์

เรียน กรรมการผู้จัดการ บริษัท เอส.พี.เอส. คอนสตรัคชั่น เซอร์วิส จำกัด

อ้างถึง คำขอขึ้นทะเบียน/ต่ออายุ/เปลี่ยนแปลงบุคลากร และชนิดสารมลพิษของห้องปฏิบัติการวิเคราะห์เอกชน  
ลงวันที่ ๑ มีนาคม ๒๕๖๕

ตามหนังสือที่อ้างถึง บริษัท เอส.พี.เอส. คอนสตรัคชั่น เซอร์วิส จำกัด ห้องปฏิบัติการวิเคราะห์เอกชน  
เลขทะเบียน ว-๐๑๑ สถานที่ตั้งเลขที่ ๗ ซอยพหลโยธิน ๒๔ ถนนพหลโยธิน แขวงจอมพล เขตจตุจักร  
กรุงเทพมหานคร ขอเปลี่ยนแปลงบุคลากรของห้องปฏิบัติการวิเคราะห์ ความละเอียดแจ้งแล้ว นั้น

กรมโรงงานอุตสาหกรรมเพื่อทราบคือ มีความเรียบร้อย

๑๓) นายสุทธิพงศ์...



อนึ่ง หนังสือฉบับนี้จะหมดอายุพร้อมหนังสือต่ออายุระบบทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน  
ที่ อก ๐๓๑๐(๑)/๑๒๑๒๔ ลงวันที่ ๓๐ ตุลาคม ๒๕๖๓ คือในวันที่ ๑๐ กรกฎาคม ๒๕๖๖ ทั้งนี้ สามารถยื่นคำขอ  
ผ่านระบบอิเล็กทรอนิกส์ได้ที่หน้าเว็บไซต์กรมโรงงานอุตสาหกรรม ตาม QR Code ท้ายหนังสือฉบับนี้

จึงเรียนมาเพื่อทราบ

ผู้  
ปฏิบัติ



ยื่นคำขอผ่านระบบอิเล็กทรอนิกส์

กองวิจัยและเตือนภัยมลพิษโรงงาน  
กลุ่มมาตรฐานวิธีการวิเคราะห์ทดสอบมลพิษและทะเบียนห้องปฏิบัติการ  
โทร. ๐ ๒๔๓๐ ๖๓๑๒ ต่อ ๒๑๐๓-๕  
โทรสาร ๐ ๒๔๓๐ ๖๓๑๒ ต่อ ๒๑๙๙  
ไปรษณีย์อิเล็กทรอนิกส์ saraban@diw.mail.go.th

ที่ อก ๐๓๑๐(๑)/ ๕๖๓ ๒



กรมโรงงานอุตสาหกรรม  
ถนนพระรามที่ ๖ แขวงทุ่งพญาไท  
เขตราชเทวี กรุงเทพฯ ๑๐๕๐๐

๑๘ เมษายน ๒๕๖๕

เรื่อง เปลี่ยนแปลงบุคลากรของห้องปฏิบัติการวิเคราะห์

เรียน กรรมการผู้จัดการ บริษัท เอส.พี.เอส. คอนสตรัคชั่น เซอร์วิส จำกัด

อ้างถึง คำขอขึ้นทะเบียน/ต่ออายุ/เปลี่ยนแปลงบุคลากร และชนิดสารมลพิษของห้องปฏิบัติการวิเคราะห์เอกชน  
ลงวันที่ ๒๕ มีนาคม ๒๕๖๕

ตามหนังสือที่อ้างถึง บริษัท เอส.พี.เอส. คอนสตรัคชั่น เซอร์วิส จำกัด ห้องปฏิบัติการวิเคราะห์เอกชน  
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กรมโรงงานอุตสาหกรรมพิจารณาแล้ว มีความเห็นดังนี้



๔. ให้เพิ่มเจ้าหน้าที่...

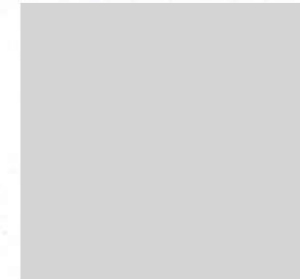
- ๒ -

ทะเบียน

นาง หนองสนบ บอนจะหมตยา ยุพธอหมตยอ ยศวานทะเบยนทองบุฏบการมเคร เลทเอกขน  
ที่ อก ๐๓๑๐(๑)/๑๒๑๒๔ ลงวันที่ ๓๐ ตุลาคม ๒๕๖๓ คือในวันที่ ๑๐ กรกฎาคม ๒๕๖๖ ทั้งนี้ สามารถยื่นคำขอ  
ผ่านระบบอิเล็กทรอนิกส์ได้ที่หน้าเว็บไซต์กรมโรงงานอุตสาหกรรม ตาม QR Code ท้ายหนังสือฉบับนี้

จึงเรียนมาเพื่อทราบ

ขอแสดงความนับถือ



ยื่นคำขอผ่านระบบอิเล็กทรอนิกส์

กองวิจัยและเตือนภัยมลพิษโรงงาน  
กลุ่มมาตรฐานวิธีการวิเคราะห์ทดสอบมลพิษและทะเบียนห้องปฏิบัติการ  
โทร. ๐ ๒๕๓๐ ๖๓๑๒ ต่อ ๒๑๐๓-๕  
โทรสาร ๐ ๒๕๓๐ ๖๓๑๒ ต่อ ๒๑๕๙  
ไปรษณีย์อิเล็กทรอนิกส์ saraban@diw.mail.go.th



## ภาคผนวกที่ 5

### เอกสารสอบเทียบเครื่องมือ

- เอกสารแนบ 5-1 เอกสารสอบเทียบเครื่องมือตรวจวัดคุณภาพอากาศ  
เอกสารแนบ 5-2 เอกสารสอบเทียบเครื่องมือตรวจวัดเสียง  
เอกสารแนบ 5-3 เอกสารสอบเทียบเครื่องมือตรวจวิเคราะห์คุณภาพน้ำ

ตารางสรุปการสอบเทียบเครื่องมือ

รายการตรวจวัด	เครื่องมือเก็บตัวอย่าง	เครื่องมือตรวจวิเคราะห์
<b>คุณภาพอากาศ</b>		
- Total Suspended Particulate (TSP)	- High Volume Air Sampler	- Electronic Balance
- Particulate Matter less than 10 micron (PM <sub>10</sub> )	- High Volume PM-10 Air Sampler	- Electronic Balance
- Carbon Monoxide (CO)	- CO Analyzer	- CO Analyzer
- Nitrogen Dioxide (NO <sub>2</sub> )	- NO <sub>2</sub> Analyzer	- NO <sub>2</sub> Analyzer
- Total Hydrocarbons (THC)	- Personal Pump SKC - Rotameter	- THC Analyzer
<b>ระดับเสียง</b>		
- Leq 1 hr, Leq 24 hr, L <sub>90</sub> , Ldn, Lmax	- Acoustic Calibrator - Sound Level Meter	- -

ตารางสรุปการสอบเทียบเครื่องมือ (ต่อ)

รายการตรวจวัด	เครื่องมือเก็บตัวอย่าง	เครื่องมือตรวจวิเคราะห์
<b>คุณภาพน้ำผิวดิน</b>		
- Temperature	-	- Thermometer
- Conductivity	-	- Conductivity Meter
- pH	-	- pH Meter
- Dissolved Oxygen	-	- DO Meter
- BOD <sub>5</sub>	-	- BOD Analyzer
- Total Suspended Solids	-	- Electronic Balance
- Total Dissolved Solids	-	- Electronic Balance
- Grease & Oil	-	- Electronic Balance
- Nitrate-Nitrogen	-	- Spectrophotometer
- Phosphate-Phosphorus	-	- Spectrophotometer
- Cadmium (Cd)	-	- ICP
- Total Coliform Bacteria (TCB)	-	- Incubator
- Fecal Coliform Bacteria (FCB)	-	- Water Bath
<b>คุณภาพน้ำใต้ดิน</b>		
- pH	-	- pH Meter
- Turbidity	-	- Turbidity Meter
- Conductivity	-	- Conductivity Meter
- Total Dissolved Solids	-	- Electronic Balance
- Total Hardness	-	-
- Nitrate	-	- Spectrophotometer
- Arsenic	-	- AAS
- Cadmium	-	- ICP
- Lead	-	- ICP
- Mercury	-	- AAS
- Total Iron	-	- ICP

**เอกสารแนบ 5-1**

เอกสารสอบเทียบเครื่องมือตรวจวัดคุณภาพอากาศ



บริษัท เอส.พี.เอส. คอนซัลติ้ง เซอร์วิส จำกัด  
S.P.S. CONSULTING SERVICE CO., LTD.  
7 ซอยพหลโยธิน 24 ถนนพหลโยธิน แขวงจอมพล เขตจตุจักร กรุงเทพฯ 10900  
7 Soi Phaholyothin 24, Phaholyothin Rd., Jompol, Chatuchak, Bangkok 10900  
Tel : (662) 939-4370-72, Fax : (662) 513-4221, E-mail : sale@spscon.com, www.spscon.com

### High Volume Air Sampler Calibration Report

Calibration Method : Multipoint Orifice Flow Transfer Standard      Model : TE 5025A      S/N : 3095

#### Calibration Data

High Volume Air Sampler Data		Calibration Data		
Recorder No.	Blower No.	Date	Actual Flowrate (ft <sup>3</sup> /min)	R <sup>2</sup>
B01	B01	05/05/2021	y = 1.212x-5.426	0.996
B02	B02	05/05/2021	y = 1.254x-7.794	1.000
B03	B03	06/05/2021	y = 1.110x-1.409	0.999
B04	B04	06/05/2021	y = 1.147x-1.143	0.995
B05	B05	05/05/2021	y = 1.168x-2.569	0.996
B06	B06	05/05/2021	y = 1.093x-0.344	0.997
B07	B07	05/05/2021	y = 1.205x-4.902	1.000
B08	B08	05/05/2021	y = 1.238x-6.622	0.999
B09	B09	06/05/2021	y = 1.269x-8.265	0.998
B10	B10	06/05/2021	y = 1.194x-3.806	1.000
B11	B11	05/05/2021	y = 1.114x-0.189	0.996
B12	B12	06/05/2021	y = 1.215x-5.647	0.997
B13	B13	07/05/2021	y = 1.042x+2.590	0.997
B14	B14	07/05/2021	y = 1.193x-4.400	0.995
B15	B15	07/05/2021	y = 1.110x+0.280	0.998
B16	B16	07/05/2021	y = 1.169x-1.647	0.997
B17	B17	07/05/2021	y = 1.141x-2.113	1.000
B18	B18	07/05/2021	y = 1.087x+1.180	0.995
B19	B19	07/05/2021	y = 1.068x+0.840	0.999
B20	B20	07/05/2021	y = 1.165x-2.676	1.000
B21	B21	06/05/2021	y = 1.165x-2.902	0.997
B22	B22	06/05/2021	y = 1.199x-3.210	0.995
B23	B23	05/05/2021	y = 1.129x-1.016	0.998
B24	B24	05/05/2021	y = 1.134x-1.666	1.000
B25	B25	05/05/2021	y = 1.102x-0.485	0.996
B26	B26	10/05/2021	y = 1.196x-5.223	0.995
B27	B27	07/05/2021	y = 1.195x-3.373	0.999
B28	B28	10/05/2021	y = 1.085x+0.527	0.997
B29	B29	05/05/2021	y = 1.302x-9.401	0.999
B30	B30	05/05/2021	y = 1.224x-5.375	0.998
B31	B31	10/05/2021	y = 1.123x+1.420	0.995
B32	B32	10/05/2021	y = 1.121x+0.234	0.997
B33	B33	10/05/2021	y = 1.167x-1.275	0.996
B34	B34	05/05/2021	y = 1.163x-2.518	0.999



บริษัท เอส.พี.เอส. คอนซัลติ้ง เซอร์วิส จำกัด  
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7 Soi Phaholyothin 24, Phaholyothin Rd., Jompol, Chatuchak, Bangkok 10900  
Tel : (662) 939-4370-72, Fax : (662) 513-4221, E-mail : sale@spscon.com, www.spscon.com

### High Volume PM-10 Air Sampler Calibration Report

Calibration Method : Multipoint Orifice Flow Transfer Standard      Model : TE 5025A      S/N : 3095

#### Calibration Data

High Volume PM-10 Data		Calibration Data		
Recorder No.	Blower No.	Date	Actual Flowrate (ft <sup>3</sup> /min)	R <sup>2</sup>
B01	B01	05/05/2021	y = 1.126x-1.784	0.998
B02	B02	06/05/2021	y = 1.131x-1.102	0.997
B03	B03	05/05/2021	y = 1.132x-1.734	0.999
B04	B04	05/05/2021	y = 1.173x-3.630	0.995
B05	B05	05/05/2021	y = 1.034x+1.685	0.996
B06	B06	05/05/2021	y = 1.126x+0.528	0.996
B07	B07	06/05/2021	y = 1.168x-3.670	1.000
B08	B08	06/05/2021	y = 1.181x-3.171	0.998
B09	B09	06/05/2021	y = 1.159x-2.669	0.996
B10	B10	07/05/2021	y = 1.194x-3.941	0.995
B11	B11	05/05/2021	y = 1.216x-5.598	0.998
B12	B12	05/05/2021	y = 1.194x-3.941	0.995
B13	B13	07/05/2021	y = 1.298x-9.093	0.999
B14	B14	07/05/2021	y = 1.109x+0.711	0.996
B15	B15	07/05/2021	y = 1.153x-1.478	0.999
B16	B16	06/05/2021	y = 1.159x-2.408	0.998
B17	B17	06/05/2021	y = 1.050x+2.515	0.996
B18	B18	06/05/2021	y = 1.126x-1.254	0.999
B19	B19	06/05/2021	y = 1.137x-3.498	0.996
B20	B20	05/05/2021	y = 1.268x-8.395	0.995
B21	B21	05/05/2021	y = 1.172x-2.559	0.996
B22	B22	05/05/2021	y = 1.156x-3.313	0.997
B23	B23	05/05/2021	y = 1.059x+1.083	0.999
B24	B24	05/05/2021	y = 1.219x-5.804	0.996
B25	B25	05/05/2021	y = 1.175x-2.855	0.999
B26	B26	06/05/2021	y = 1.146x-2.716	0.995
B27	B27	06/05/2021	y = 1.083x+0.706	0.998
B28	B28	05/05/2021	y = 1.253x-7.934	0.997
B29	B29	05/05/2021	y = 1.186x-4.490	0.995
B30	B30	07/05/2021	y = 1.155x-1.630	0.998
B31	B31	05/05/2021	y = 1.112x-1.543	0.999
B32	B32	07/05/2021	y = 1.079x+0.704	0.997
B33	B33	07/05/2021	y = 1.221x-4.365	1.000
B34	B34	07/05/2021	y = 1.185x-3.259	0.997





บริษัท เอส.พี.เอส. คอนซัลติ้ง เซอร์วิส จำกัด  
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Tel : (662) 939-4370-72, Fax : (662) 513-4221, E-mail : sale@spscon.com, www.spscon.com

Personal Pump Calibration Report												
Calibration Method : Dry Cal Primary Flowmeter					Model : Defender 510-H					S/N : 136164		
Environmental Conditions												
Temperature					25			± 3		°C		
Pressure					1010			± 15		mmbar		
Personal Pump Data				Calibration Data								
No.	Brand	Model	Serial No.	Date	Flow Rate (ml/min)						Value From Calibration Curve	
					Setting			Actual (Q std.)				
					1	2	3	1	2	3	y	R²
B41	SKC	224-PCXR4	612689	01/04/2021	1,000	1,500	2,000	997	1,495	1,997	0.999x - 3.271	1.000
B42	SKC	224-PCXR4	628041	01/04/2021	1,000	1,500	2,000	996	1,495	1,996	0.998x - 0.610	1.000
B43	SKC	224-PCXR4	034636	01/04/2021	1,000	1,500	2,000	1,002	1,501	2,005	1.014x - 26.861	0.999
B44	SKC	224-PCXR8	529341	01/04/2021	1,000	1,500	2,000	993	1,504	2,001	1.015x - 31.576	0.999
B45	SKC	224-PCXR8	529594	01/04/2021	1,000	1,500	2,000	997	1,499	1,993	0.997x - 0.666	1.000
B46	SKC	224-PCXR8	566743	01/04/2021	1,000	1,500	2,000	1,002	1,500	2,002	1.013x - 23.707	0.999
B47	SKC	224-PCXR8	566747	01/04/2021	1,000	1,500	2,000	995	1,505	2,002	1.015x - 30.385	0.999
B48	SKC	224-PCXR8	566753	01/04/2021	1,000	1,500	2,000	1,001	1,502	2,004	1.013x - 23.787	0.999
B49	SKC	224-PCXR8	566760	01/04/2021	1,000	1,500	2,000	998	1,492	1,993	0.997x + 0.311	1.000
B50	SKC	224-PCXR8	500400	01/04/2021	1,000	1,500	2,000	1,004	1,499	2,004	1.013x - 23.536	0.999
B51	SKC	224-PCXR8	500363	02/04/2021	1,000	1,500	2,000	999	1,492	1,996	0.997x - 0.686	1.000
B52	SKC	224-PCXR8	093186	02/04/2021	1,000	1,500	2,000	1,001	1,501	2,004	1.014x - 26.176	0.999
B53	SKC	224-PCXR8	707670	02/04/2021	1,000	1,500	2,000	997	1,499	1,993	0.998x - 0.989	1.000
B54	SKC	224-PCXR3	509821	02/04/2021	1,000	1,500	2,000	992	1,505	2,003	1.019x - 36.706	0.999
B55	SKC	224-PCXR3	510710	02/04/2021	1,000	1,500	2,000	1,003	1,499	2,003	1.011x - 21.761	0.999
B56	SKC	224-PCXR3	511450	05/04/2021	1,000	1,500	2,000	995	1,498	1,995	1.000x - 3.829	1.000
B57	SKC	224-PCXR3	510798	05/04/2021	1,000	1,500	2,000	1,002	1,500	2,001	1.010x - 20.164	0.999
B58	SKC	224-PCXR3	509852	05/04/2021	1,000	1,500	2,000	993	1,503	2,002	1.017x - 35.015	0.999
B59	SKC	224-PCXR3	509862	05/04/2021	1,000	1,500	2,000	999	1,493	1,998	0.999x - 3.314	1.000
B60	SKC	224-PCXR3	512655	05/04/2021	1,000	1,500	2,000	1,000	1,500	2,002	1.012x - 23.332	0.999
B61	SKC	224-PCXR3	503915	05/04/2021	1,000	1,500	2,000	999	1,494	1,991	0.995x + 2.840	1.000
B62	SKC	224-PCXR3	505975	05/04/2021	1,000	1,500	2,000	993	1,503	2,003	1.018x - 36.606	0.999
B63	SKC	224-PCXR3	511432	05/04/2021	1,000	1,500	2,000	1,003	1,501	2,002	1.009x - 18.993	0.999
B64	SKC	224-PCXR3	508302	05/04/2021	1,000	1,500	2,000	1,001	1,496	1,997	0.996x + 3.614	1.000
B65	SKC	224-PCXR3	508310	05/04/2021	1,000	1,500	2,000	995	1,502	2,001	1.013x - 28.697	0.999
B66	SKC	224-PCXR3	509861	01/04/2021	1,000	1,500	2,000	997	1,495	1,994	0.995x + 3.227	1.000
B67	SKC	224-PCXR3	506295	07/04/2021	1,000	1,500	2,000	1,003	1,501	2,004	1.011x - 21.111	0.999
B68	SKC	224-PCXR3	506872	07/04/2021	1,000	1,500	2,000	1,001	1,494	1,994	0.994x + 4.515	1.000
B69	SKC	224-PCXR3	508375	05/04/2021	1,000	1,500	2,000	1,004	1,501	2,002	1.011x - 20.971	0.999
B70	SKC	224-PCXR3	510623	07/04/2021	1,000	1,500	2,000	994	1,503	2,000	1.016x - 31.158	0.999
B71	SKC	224-PCXR3	508387	07/04/2021	1,000	1,500	2,000	1,002	1,499	2,003	1.012x - 23.141	0.999
B72	SKC	224-PCXR3	505977	07/04/2021	1,000	1,500	2,000	996	1,495	1,997	1.002x - 6.721	1.000
B73	SKC	224-PCXR3	512606	07/04/2021	1,000	1,500	2,000	995	1,490	1,993	0.995x + 2.463	1.000
B74	SKC	224-PCXR3	505993	02/04/2021	1,000	1,500	2,000	997	1,507	2,001	1.018x - 27.528	0.999
B75	SKC	224-PCXR3	509820	07/04/2021	1,000	1,500	2,000	1,000	1,493	1,992	0.993x + 5.472	1.000
B76	SKC	224-PCXR3	509811	07/04/2021	1,000	1,500	2,000	993	1,505	2,001	1.017x - 31.221	0.999
B77	SKC	224-PCXR3	508301	07/04/2021	1,000	1,500	2,000	1,002	1,501	2,002	1.011x - 21.629	0.999
B78	SKC	224-PCXR3	510677	05/04/2021	1,000	1,500	2,000	999	1,498	1,996	1.001x - 4.363	1.000
B79	SKC	224-PCXR3	510920	07/04/2021	1,000	1,500	2,000	992	1,504	2,000	1.016x - 32.725	0.999



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Rotameter Calibration Report (For Personal Pump Low Flow Adjust)											
Calibration Method : Dry Cal Primary Flowmeter				Model : Defender 510-H				S/N : 136164			
Rotameter Data				Calibration Data							
No.	Brand	Model	Date	Flow Rate (ml/min)						Value From Calibration Curve	
				Flow Rate (Reading)			Actual (Q std.)				
				1	2	3	1	2	3	y	R <sup>2</sup>
L-B01	Dwyer	VFA-21	05/04/2021	50	100	200	49.8	100.1	200.3	0.994x + 1.107	1.000
L-B02	Dwyer	VFA-21	01/04/2021	50	100	200	50.6	99.2	199.4	1.001x - 0.294	1.000
L-B03	Dwyer	VFA-21	01/04/2021	50	100	200	50.2	99.4	199.8	1.002x + 0.059	1.000
L-B04	Dwyer	VFA-21	01/04/2021	50	100	200	49.3	99.1	201.1	0.988x + 0.882	1.000
L-B05	Dwyer	VFA-21	02/04/2021	50	100	200	49.8	99.4	198.4	1.003x - 0.780	1.000
L-B06	Dwyer	VFA-21	05/04/2021	50	100	200	50.0	99.2	197.9	0.995x - 0.038	1.000
L-B07	Dwyer	VFA-21	02/04/2021	50	100	200	49.9	100.3	198.7	1.002x - 0.835	1.000
L-B08	Dwyer	VFA-21	01/04/2021	50	100	200	49.7	100.1	200.7	0.992x + 1.073	1.000
L-B09	Dwyer	VFA-21	02/04/2021	50	100	200	49.7	100.2	199.3	0.994x - 0.029	1.000
L-B10	Dwyer	VFA-21	05/04/2021	50	100	200	50.1	99.0	199.1	0.989x + 1.074	1.000



CERTIFICATE No : 21M3169  
REFERENCE No : 60627-5

PAGE : 1 OF 2

### Certificate of Calibration

EQUIPMENT : DIGITAL BALANCE  
MANUFACTURER : METTLER TOLEDO  
MODEL : XS105DU  
SERIAL No : 1126422905  
ID No : BA 05/50  
CONDITION AS RECEIVED : USED ITEM  
SUBMITTED BY : S.P.S. CONSULTING SERVICE CO., LTD.  
7 SOI PHAHOLYOTHIN 24, PHAHOLYOTHIN RD.,  
JOMPOL, CHATUCHAK, BANGKOK 10900

CALIBRATED BY : ATSAWIN Y.

CALIBRATION DATE : 19-Mar-21

APPROVED BY :

ISSUED DATE : 20-Mar-21

RECEIVED DATE : 19-Mar-21

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

F-G010 REV 02



CERTIFICATE No : 21M3169

PAGE : 2 OF 2

### Calibration Report

EQUIPMENT : DIGITAL BALANCE MODEL : XS105DU  
MANUFACTURER : METTLER TOLEDO S/N : 1126422905  
ID No : BA 05/50 RECEIVED DATE : 19-Mar-21  
AIR PRESSURE : 1009mbar  $\pm$  1mbar CALIBRATION DATE : 19-Mar-21  
AMBIENT TEMPERATURE : 24° C  $\pm$  1° C RELATIVE HUMIDITY : 52 %RH  $\pm$  10 % RH

#### CONDITION OF THIS RESULTS OF CALIBRATION

1. THIS INSTRUMENT WAS CALIBRATED BY ACCORDING TO UKAS LAB 14 EDITION 6:2019 BY USING KNOWN WEIGHT STANDARD WEIGHT. THE BALANCE WAS ADJUSTED USING WEIGHT OF QUALITY CALIBRATION TO ADJUST. THE BALANCE HAS NO ZERO TRACKING FUNCTION. REPEATABILITY WAS MEASURED BY USING 10 REPEATED MEASUREMENTS. LINEARITY WAS MEASURED COVERING 10 POINTS, EVENLY SPREAD OVER THE RANGE. THE INSTRUMENT WAS SET ZERO BEFORE PERFORMING THE LINEARITY TEST. OFF-CENTER LOADING WAS MEASURED BY USING STANDARD WEIGHTS PLACED ON THE PAN AND MOVED TO VARIOUS POSITIONS ON THE PAN.

#### 2. REFERENCE STANDARD INSTRUMENTS :-

INSTRUMENT	MODEL	SERIAL No	CERTIFICATE No	DUE DATE
1) STANDARD WEIGHT SET	E2	QK-I-151	C02210415	09-Feb-23
2) STANDARD WEIGHT	E2	15843	C02210419	10-Feb-23
3) STANDARD WEIGHT	E2	QK-I-349	M21032358	26-Mar-23

3. THIS RESULT WAS FOUND ACCURATE AS SHOWN ON DATE AND PLACE OF CALIBRATION ONLY.

4. THIS RESULT EXCLUDE LONG TERM STABILITY OF THE UNIT UNDER CALIBRATION.

5. THIS CERTIFICATE IS TRACEABLE TO THE INTERNATIONAL SYSTEM OF UNIT MAINTAINED AT:-

- NATIONAL INSTITUTE OF METROLOGY (THAILAND) THROUGH CENTRAL BUREAU OF WEIGHTS&MEASURES

#### RESULT OF CALIBRATION :- WITHOUT ADJUSTMENT

1. ZERO SETTING FUNCTION : NORMAL

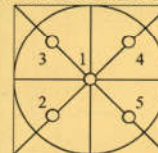
2. TARE FUNCTION : NORMAL

3. REPEATABILITY OF READING AT 100 g WAS 0.000055 g

4. DEPARTURE FROM NOMINAL VALUE/ LINEARITY

NOMINAL VALUE (g)	BALANCE READING (g)	CORRECTION (g)	UNCERTAINTY ( $\pm$ g)
0.00	0.00000	0.00000	0.000066
0.02	0.01998	0.00002	0.000066
0.10	0.10001	-0.00001	0.000066
0.20	0.20001	-0.00001	0.000067
0.50	0.49996	0.00004	0.000065
1.00	0.99997	0.00003	0.000066
2.00	2.00000	0.00000	0.000067
5.00	5.00002	-0.00002	0.000068
10.00	10.00003	-0.00003	0.000070
20.00	20.0000	0.0000	0.000075
50.00	50.0000	0.0000	0.00013
100.00	100.0001	-0.0001	0.00019
120.00	120.0001	-0.0001	0.00022

#### 5. OFF CENTER LOADING ERROR



POINT	READING (g)
1	50.0000
2	50.0000
3	50.0000
4	50.0000
5	50.0000
OFF-CENTER LOADING	0.0000

NOTE: THIS CALIBRATION WAS CARRIED OUT AT THE CUSTOMER'S PLACE AT LABORATORY AREA  
THE REPORTED UNCERTAINTY OF MEASUREMENT WAS BASED ON A STANDARD UNCERTAINTY MULTIPLIED BY A  
COVERAGE FACTOR  $k=2$ , PROVIDING A LEVEL OF CONFIDENCE APPROXIMATELY 95%.

END OF CALIBRATION REPORT





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CALIBRATION REPORT					
NON-DISPERSIVE INFRARED CO ANALYZER					
DATE :	01 March 2022	BRAND :	API	MODEL :	300E
NO.	CO-B01	SERIAL NO.	782		
Calibrator (Dilution System)					
Brand	: API		Model	: 700	
Last Cal. Date	: 20 September 2021		Serial No.	: 421	
Reference Standard Gas					
Standard Gas	: Carbon Monoxide (CO)		Cylinder No.	: D824478	
Certified Date	: 15 April 2020	Expired Date	: 14 April 2022	Cylinder Conc.	: 4,740 PPM
CALIBRATING CONDITION					
Pressure	1011	mmbar	Temp.	24.5	°C
			% RH	48	
CALIBRATION SETTING					
Span	Initial Reading (Before Adj.),PPM			Final Reading (After Adj.),PPM	
Set Point	Expected Concentration	Analyzer Response	%Dif	Analyzer Response	
Zero	0	-0.10	-	0	
CO Span	40.00	39.97	-0.075	40.00	
API Model 300E CO Analyzer Check list					
Parameter	Observed Value	Units	Nominal Range		
RANGE	50	PPM	0-1000 ppm		
STABILITY	0.10	PPM	< 1 ppm with zero air		
CO MEASURE	4014.9	mV	2500-4800 mV		
CO REFERENCE	3948.5	mV	2500-4800 mV		
MEASURE/REFERENCE RATIO	1.180	-	1.1-1.3 w/zero air		
SAMPLE PRESSURE	28.4	In-Hg-A	~2" < ambient absolute pressure		
SAMPLE FLOW	811	cc/min	800 ± 10%		
SAMPLE TEMPERATURE	48.6	°C	48 ± 4		
BENCH TEMPERATURE	48.3	°C	48 ± 2		
WHEEL TEMPERATURE	68.5	°C	68 ± 2		
BOX TEMPERATURE	30.6	°C	Ambient temp + 7 ± 10		
PHOTO-DRIVE	3005.7	mV	250 mV to 4750 mV		
SLOPE	1.017	-	1.0 ± 0.3		
OFFSET	0.2	-	0 ± 0.3		



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CALIBRATION REPORT					
NON-DISPERSIVE INFRARED CO ANALYZER					
DATE :	01 March 2022	BRAND :	API	MODEL :	300E
NO.	CO-B03	SERIAL NO.	3019		
Calibrator (Dilution System)					
Brand	: API		Model	: 700	
Last Cal. Date	: 20 September 2021		Serial No.	: 421	
Reference Standard Gas					
Standard Gas	: Carbon Monoxide (CO)		Cylinder No.	: D824478	
Certified Date	: 15 April 2020	Expired Date	: 14 April 2022	Cylinder Conc.	: 4,740 PPM
CALIBRATING CONDITION					
Pressure	1011	mmbar	Temp.	24.5	°C
			% RH	48	
CALIBRATION SETTING					
Span	Initial Reading (Before Adj.),PPM			Final Reading (After Adj.),PPM	
Set Point	Expected Concentration	Analyzer Response	%Dif	Analyzer Response	
Zero	0	0.11	-	0	
CO Span	40.00	40.07	0.175	40.00	
API Model 300E CO Analyzer Check list					
Parameter	Observed Value	Units	Nominal Range		
RANGE	50	PPM	0-1000 ppm		
STABILITY	0.10	PPM	< 1 ppm with zero air		
CO MEASURE	4015.8	mV	2500-4800 mV		
CO REFERENCE	3949.2	mV	2500-4800 mV		
MEASURE/REFERENCE RATIO	1.180	-	1.1-1.3 w/zero air		
SAMPLE PRESSURE	28.7	In-Hg-A	~2" < ambient absolute pressure		
SAMPLE FLOW	808	cc/min	800 ± 10%		
SAMPLE TEMPERATURE	48.4	°C	48 ± 4		
BENCH TEMPERATURE	48.2	°C	48 ± 2		
WHEEL TEMPERATURE	68.3	°C	68 ± 2		
BOX TEMPERATURE	30.9	°C	Ambient temp + 7 ± 10		
PHOTO-DRIVE	3009.5	mV	250 mV to 4750 mV		
SLOPE	1.017	-	1.0 ± 0.3		
OFFSET	0.2	-	0 ± 0.3		



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# CALIBRATION REPORT

## NON-DISPERSIVE INFRARED CO ANALYZER

DATE : 01 March 2022 BRAND : API MODEL : 300E  
NO. CO-B06 SERIAL NO. 3117

### Calibrator (Dilution System)

Brand : API Model : 700  
Last Cal. Date : 20 September 2021 Serial No. : 421

### Reference Standard Gas

Standard Gas : Carbon Monoxide (CO) Cylinder No. : D824478  
Certified Date : 15 April 2020 Expired Date : 14 April 2022 Cylinder Conc. : 4,740 PPM

### CALIBRATING CONDITION

Pressure 1011 mmbar Temp. 24.6 °C % RH 49

### CALIBRATION SETTING

Span	Initial Reading (Before Adj.),PPM			Final Reading (After Adj.),PPM
Set Point	Expected Concentration	Analyzer Response	%Dif	Analyzer Response
Zero	0	-0.10	-	0
CO Span	40.00	40.09	0.225	40.00

### API Model 300E CO Analyzer Check list

Parameter	Observed Value	Units	Nominal Range
RANGE	50	PPM	0-1000 ppm
STABILITY	0.10	PPM	< 1 ppm with zero air
CO MEASURE	4014.1	mV	2500-4800 mV
CO REFERENCE	3948.9	mV	2500-4800 mV
MEASURE/REFERENCE RATIO	1.179	-	1.1-1.3 w/zero air
SAMPLE PRESSURE	28.6	In-Hg-A	-2" < ambient absolute pressure
SAMPLE FLOW	805	cc/min	800 ± 10%
SAMPLE TEMPERATURE	48.3	°C	48 ± 4
BENCH TEMPERATURE	48.0	°C	48 ± 2
WHEEL TEMPERATURE	68.5	°C	68 ± 2
BOX TEMPERATURE	30.6	°C	Ambient temp + 7 ± 10
PHOTO-DRIVE	3008.9	mV	250 mV to 4750 mV
SLOPE	1.017	-	1.0 ± 0.3
OFFSET	0.2	-	0 ± 0.3



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# CALIBRATION REPORT

## NON-DISPERSIVE INFRARED CO ANALYZER

DATE : 01 March 2022 BRAND : API MODEL : 300E  
NO. CO-B10 SERIAL NO. 199-S

### Calibrator (Dilution System)

Brand : API Model : 700  
Last Cal. Date : 20 September 2021 Serial No. : 421

### Reference Standard Gas

Standard Gas : Carbon Monoxide (CO) Cylinder No. : D824478  
Certified Date : 15 April 2020 Expired Date : 14 April 2022 Cylinder Conc. : 4,740 PPM

### CALIBRATING CONDITION

Pressure 1011 mmbar Temp. 24.6 °C % RH 49

### CALIBRATION SETTING

Span	Initial Reading (Before Adj.),PPM			Final Reading (After Adj.),PPM
Set Point	Expected Concentration	Analyzer Response	%Dif	Analyzer Response
Zero	0	0.11	-	0
CO Span	40.00	39.90	-0.250	40.00

### API Model 300E CO Analyzer Check list

Parameter	Observed Value	Units	Nominal Range
RANGE	50	PPM	0-1000 ppm
STABILITY	0.10	PPM	< 1 ppm with zero air
CO MEASURE	4015.7	mV	2500-4800 mV
CO REFERENCE	3949.3	mV	2500-4800 mV
MEASURE/REFERENCE RATIO	1.180	-	1.1-1.3 w/zero air
SAMPLE PRESSURE	28.7	In-Hg-A	-2" < ambient absolute pressure
SAMPLE FLOW	810	cc/min	800 ± 10%
SAMPLE TEMPERATURE	48.5	°C	48 ± 4
BENCH TEMPERATURE	48.2	°C	48 ± 2
WHEEL TEMPERATURE	68.4	°C	68 ± 2
BOX TEMPERATURE	30.8	°C	Ambient temp + 7 ± 10
PHOTO-DRIVE	3020.2	mV	250 mV to 4750 mV
SLOPE	1.017	-	1.0 ± 0.3
OFFSET	0.2	-	0 ± 0.3



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CALIBRATION REPORT					
NON-DISPERSIVE INFRARED CO ANALYZER					
DATE :	01 March 2022	BRAND :	Thermo	MODEL :	48C
NO.	CO-B11	SERIAL NO.	0401304262		
Calibrator (Dilution System)					
Brand	: API		Model	: 700	
Last Cal. Date	: 20 September 2021		Serial No.	: 421	
Reference Standard Gas					
Standard Gas	: Carbon Monoxide (CO)		Cylinder No.	: D824478	
Certified Date	: 15 April 2020	Expired Date	: 14 April 2022	Cylinder Conc.	: 4,740 PPM
CALIBRATING CONDITION					
Pressure	1011	mmbar	Temp.	24.5	°C
% RH	49				
CALIBRATION SETTING					
Span	Initial Reading (Before Adj.),PPM			Final Reading (After Adj.),PPM	
Set Point	Expected Concentration	Analyzer Response	%Dif	Analyzer Response	
Zero	0	0.10	-	0	
CO Span	40.00	39.94	-0.150	40.00	
INSTRUMENT STATUS					
CHAMBER TEMP	47.2 °C		FLOW	1.5 LPM	
PRESSURE	730.8 mm Hg		MOTOR SPEED	100.00%	



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CALIBRATION REPORT					
CHEMILUMINESCENT NO / NO <sub>2</sub> / NO <sub>x</sub> ANALYZER					
DATE :	01 March 2022	BRAND :	API	MODEL :	200E
NO.	NOX-R09	SERIAL NO.	252		
Calibrator (Dilution System)					
Brand	: API		Model	: 700	
Last Cal. Date	: 05 August 2021		Serial No.	: 911	
Reference Standard Gas					
Standard Gas	: Nitric Oxide (NO)		Cylinder No.	: A00917SK	
Certified Date	: 01 June 2020	Expired Date	: 01 June 2022	Cylinder Conc.	: 49.9 ppm
CALIBRATING CONDITION					
Pressure	1011	mmbar	Temp.	24.5	°C
% RH	49				
CALIBRATION SETTING					
Span	Initial Reading (Before Adj.),PPB			Final Reading (After Adj.),PPB	
Set Point	Expected Concentration	Analyzer Response	%Dif	Analyzer Response	Slope
Zero	0	0.10	-	0	-
NO Span	400	400.1	0.025	400.0	1.005
NO <sub>x</sub> Span	400	400.2	0.050	400.0	1.010
API Model 200E NO <sub>x</sub> Analyzer Check List					
Test Values	Observed Value	Units	Nominal Range		
RANGE	500	PPB	500 standard		
STABILITY (Zero Gas)	0.1	PPB	< 2 with zero air		
SAMPLE FLOW	507	cc/min	500 ± 50		
OZONE FLOW	78	cc/min	80 ± 15		
PMT	103.0	mV	-20 - 150		
AZERO	93.9	mV	-20 - 150		
HVPS	674	V	420 - 900 constant		
RCELL TEMP	50.1	°C	50 ± 1		
BOX TEMP	29.3	°C	8 - 48		
PMT TEMP	7.2	°C	7 ± 2		
MOLY TEMP	314.8	°C	315 ± 5		
RCELL PRESS	8.3	IN-Hg-A	2 - 10 constant		
SAMPLE PRESS	28.6	IN-Hg-A	25 - 30 constant		
NO Span Conc	400	PPB	20 - 20,000		
NO <sub>x</sub> Span Conc	400	PPB	20 - 20,000		
NO Slope	1.005	-	1.0 ± 0.3		
NO <sub>x</sub> Slope	1.010	-	1.0 ± 0.3		
NO Offset	1.3	mV	-20 to +150		
NO <sub>x</sub> Offset	0.9	mV	-20 to 150		
Stability at Zero	0.1	PPB	< 0.2		
Stability at Span	0.2	PPB	< 2 ppb @ 400 ppb span gas		





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CALIBRATION REPORT					
CHEMILUMINESCENT NO / NO <sub>2</sub> / NO <sub>x</sub> ANALYZER					
DATE :	01 March 2022	BRAND :	API	MODEL :	200E
NO.	NOX-B05	SERIAL NO.	2284		
Calibrator (Dilution System)					
Brand	: API		Model	: 700	
Last Cal. Date	: 05 August 2021		Serial No.	: 911	
Reference Standard Gas					
Standard Gas	: Nitric Oxide (NO)		Cylinder No.	: A00917SK	
Certified Date	: 01 June 2020		Expired Date	: 01 June 2022	
Cylinder Conc.				: 49.9 ppm	
CALIBRATING CONDITION					
Pressure	1011	mmbar	Temp.	24.6	°C
% RH	49				
CALIBRATION SETTING					
Span	Initial Reading (Before Adj.),PPB			Final Reading (After Adj.),PPB	
Set Point	Expected Concentration	Analyzer Response	%Dif	Analyzer Response	Slope
Zero	0	-0.10	-	0	-
NO Span	400	400.1	0.025	400.0	1.006
NO <sub>x</sub> Span	400	400.4	0.100	400.0	1.011
API Model 200E NO <sub>x</sub> Analyzer Check List					
Test Values	Observed Value	Units	Nominal Range		
RANGE	500	PPB	500 standard		
STABILITY (Zero Gas)	0.1	PPB	< 2 with zero air		
SAMPLE FLOW	510	cc/min	500 ± 50		
OZONE FLOW	79	cc/min	80 ± 15		
PMT	103.1	mV	-20 - 150		
AZERO	94.2	mV	-20 - 150		
HVPS	671	V	420 - 900 constant		
RCELL TEMP	50.4	°C	50 ± 1		
BOX TEMP	29.3	°C	8 - 48		
PMT TEMP	7.1	°C	7 ± 2		
MOLY TEMP	315.3	°C	315 ± 5		
RCELL PRESS	8.2	IN-Hg-A	2 - 10 constant		
SAMPLE PRESS	28.4	IN-Hg-A	25 - 30 constant		
NO Span Conc	400	PPB	20 - 20,000		
NO <sub>x</sub> Span Conc	400	PPB	20 - 20,000		
NO Slope	1.006	-	1.0 ± 0.3		
NO <sub>x</sub> Slope	1.011	-	1.0 ± 0.3		
NO Offset	1.4	mV	-20 to +150		
NO <sub>x</sub> Offset	0.9	mV	-20 to 150		
Stability at Zero	0.1	PPB	< 0.2		
Stability at Span	0.2	PPB	< 2 ppb @ 400 ppb span gas		



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CALIBRATION REPORT					
CHEMILUMINESCENT NO / NO <sub>2</sub> / NO <sub>x</sub> ANALYZER					
DATE :	01 March 2022	BRAND :	API	MODEL :	200E
NO.	NOX-B08	SERIAL NO.	4336		
Calibrator (Dilution System)					
Brand	: API		Model	: 700	
Last Cal. Date	: 05 August 2021		Serial No.	: 911	
Reference Standard Gas					
Standard Gas	: Nitric Oxide (NO)		Cylinder No.	: A00917SK	
Certified Date	: 01 June 2020		Expired Date	: 01 June 2022	
Cylinder Conc.				: 49.9 ppm	
CALIBRATING CONDITION					
Pressure	1011	mmbar	Temp.	24.6	°C
% RH	49				
CALIBRATION SETTING					
Span	Initial Reading (Before Adj.),PPB			Final Reading (After Adj.),PPB	
Set Point	Expected Concentration	Analyzer Response	%Dif	Analyzer Response	Slope
Zero	0	0.10	-	0	-
NO Span	400	399.5	-0.125	400.0	0.998
NO <sub>x</sub> Span	400	399.8	-0.050	400.0	1.004
API Model 200E NO <sub>x</sub> Analyzer Check List					
Test Values	Observed Value	Units	Nominal Range		
RANGE	500	PPB	500 standard		
STABILITY (Zero Gas)	0.1	PPB	< 2 with zero air		
SAMPLE FLOW	505	cc/min	500 ± 50		
OZONE FLOW	78	cc/min	80 ± 15		
PMT	103.3	mV	-20 - 150		
AZERO	94.1	mV	-20 - 150		
HVPS	673	V	420 - 900 constant		
RCELL TEMP	50.2	°C	50 ± 1		
BOX TEMP	29.4	°C	8 - 48		
PMT TEMP	7.3	°C	7 ± 2		
MOLY TEMP	314.8	°C	315 ± 5		
RCELL PRESS	8.4	IN-Hg-A	2 - 10 constant		
SAMPLE PRESS	28.6	IN-Hg-A	25 - 30 constant		
NO Span Conc	400	PPB	20 - 20,000		
NO <sub>x</sub> Span Conc	400	PPB	20 - 20,000		
NO Slope	0.998	-	1.0 ± 0.3		
NO <sub>x</sub> Slope	1.004	-	1.0 ± 0.3		
NO Offset	0.9	mV	-20 to +150		
NO <sub>x</sub> Offset	0.5	mV	-20 to 150		
Stability at Zero	0.1	PPB	< 0.2		
Stability at Span	0.2	PPB	< 2 ppb @ 400 ppb span gas		



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CALIBRATION REPORT					
CHEMILUMINESCENT NO / NO <sub>2</sub> / NO <sub>x</sub> ANALYZER					
DATE :	01 March 2022	BRAND :	API	MODEL :	200A
NO.	NOX-B02	SERIAL NO.	2409		
Calibrator (Dilution System)					
Brand :	API	Model :	700		
Last Cal. Date :	05 August 2021	Serial No. :	911		
Reference Standard Gas					
Standard Gas :	Nitric Oxide (NO)	Cylinder No. :	A00917SK		
Certified Date :	01 June 2020	Expired Date :	01 June 2022	Cylinder Conc. :	49.9 ppm
CALIBRATING CONDITION					
Pressure	1011 mmbar	Temp.	24.5 °C	% RH	48
CALIBRATION SETTING					
Span	Initial Reading (Before Adj.),PPB			Final Reading (After Adj.),PPB	
Set Point	Expected Concentration	Analyzer Response	%Dif	Analyzer Response	Slope
Zero	0	-0.10	-	0	-
NO Span	400	399.7	-0.075	400.0	1.003
NO <sub>x</sub> Span	400	400.1	0.025	400.0	1.006
API Model 200A NO <sub>x</sub> Analyzer Check List					
Test Values	Observed Value	Units	Nominal Range		
RANGE	500	PPB	500 standard		
STABILITY (Zero Gas)	0.1	PPB	< 2 with zero air		
SAMPLE FLOW	510	cc/min	500 ± 50		
OZONE FLOW	79	cc/min	80 ± 15		
PMT	103.2	mV	-20 - 150		
AZERO	93.8	mV	-20 - 150		
HVPS	673	V	420 - 900 constant		
RCELL TEMP	50.4	°C	50 ± 1		
BOX TEMP	29.2	°C	8 - 48		
PMT TEMP	7.3	°C	7 ± 2		
MOLY TEMP	315.2	°C	315 ± 5		
RCELL PRESS	8.4	IN-Hg-A	2 - 10 constant		
SAMPLE PRESS	28.7	IN-Hg-A	25 - 30 constant		
NO Span Conc	400	PPB	20 - 20,000		
NO <sub>x</sub> Span Conc	400	PPB	20 - 20,000		
NO Slope	1.003	-	1.0 ± 0.3		
NO <sub>x</sub> Slope	1.006	-	1.0 ± 0.3		
NO Offset	1.1	mV	-20 to +150		
NO <sub>x</sub> Offset	0.7	mV	-20 to 150		
Stability at Zero	0.1	PPB	< 0.2		
Stability at Span	0.2	PPB	< 2 ppb @ 400 ppb span gas		



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CALIBRATION REPORT					
CHEMILUMINESCENT NO / NO <sub>2</sub> / NO <sub>x</sub> ANALYZER					
DATE :	01 March 2022	BRAND :	API	MODEL :	200E
NO.	NOX-B11	SERIAL NO.	4467		
Calibrator (Dilution System)					
Brand :	API	Model :	700		
Last Cal. Date :	05 August 2021	Serial No. :	911		
Reference Standard Gas					
Standard Gas :	Nitric Oxide (NO)	Cylinder No. :	A00917SK		
Certified Date :	01 June 2020	Expired Date :	01 June 2022	Cylinder Conc. :	49.9 ppm
CALIBRATING CONDITION					
Pressure	1011 mmbar	Temp.	24.5 °C	% RH	48
CALIBRATION SETTING					
Span	Initial Reading (Before Adj.),PPB			Final Reading (After Adj.),PPB	
Set Point	Expected Concentration	Analyzer Response	%Dif	Analyzer Response	Slope
Zero	0	0.11	-	0	-
NO Span	400	400.1	0.025	400.0	1.005
NO <sub>x</sub> Span	400	400.2	0.050	400.0	1.010
API Model 200E NO <sub>x</sub> Analyzer Check List					
Test Values	Observed Value	Units	Nominal Range		
RANGE	500	PPB	500 standard		
STABILITY (Zero Gas)	0.1	PPB	< 2 with zero air		
SAMPLE FLOW	505	cc/min	500 ± 50		
OZONE FLOW	78	cc/min	80 ± 15		
PMT	103.1	mV	-20 - 150		
AZERO	94.3	mV	-20 - 150		
HVPS	675	V	420 - 900 constant		
RCELL TEMP	50.1	°C	50 ± 1		
BOX TEMP	29.0	°C	8 - 48		
PMT TEMP	7.2	°C	7 ± 2		
MOLY TEMP	314.8	°C	315 ± 5		
RCELL PRESS	8.3	IN-Hg-A	2 - 10 constant		
SAMPLE PRESS	28.4	IN-Hg-A	25 - 30 constant		
NO Span Conc	400	PPB	20 - 20,000		
NO <sub>x</sub> Span Conc	400	PPB	20 - 20,000		
NO Slope	1.005	-	1.0 ± 0.3		
NO <sub>x</sub> Slope	1.010	-	1.0 ± 0.3		
NO Offset	1.4	mV	-20 to +150		
NO <sub>x</sub> Offset	0.9	mV	-20 to 150		
Stability at Zero	0.1	PPB	< 0.2		
Stability at Span	0.2	PPB	< 2 ppb @ 400 ppb span gas		

**เอกสารแนบ 5-2**

**เอกสารสอบเทียบเครื่องมือตรวจวัดเสียง**



THAILAND INSTITUTE OF SCIENTIFIC AND TECHNOLOGICAL RESEARCH (TISTR)

Request No. 21-64/0528 MTC No. EEL. BP. 17/0564

## CALIBRATION CERTIFICATE

**Submitted by** : S.P.S. Consulting Services Service Co.,Ltd.  
**Address** : 7 Soi Phaholyothin 24, Phaholyothin Road, Jompoi, Chatuchak, Bangkok 10900.  
**Calibrated at** : Electrical and Electronic Standards Laboratory, Industrial Metrology and Testing Service Centre.  
 : Soi 1C, Bangpoo Industrial Estate, Sukhumvit Rd., Muang, Samutprakan 10280.

**Instrument Calibrated :**  
 Description : Sound Calibrator  
 Manufacturer : ACO  
 Model : 2127  
 Serial No. : 130006  
**Ambient Environment**  
 Temperature : (23 ± 3) °C  
 Relative Humidity : (50 ± 15) %  
 Ambient Pressure : (101.325 ± 1.500) kPa

**Standards used :** 1. Digital Function Synthesizer NF Electronic DF-193A S/N 122037.  
 2. Measuring Amplifier Bruel&Kjaer 2636 S/N 1537484.  
 3. Programmable Attenuator Tamagawa TPA-303A S/N OF 2214.  
 4. Digital Multimeter Agilent 34401A S/N MY44005560.  
 5. Pressure Transmitter Vaisala PTB202AD S/N T0650001.  
 6. Audio Analyzer Keithley 2015-P S/N 4106495.  
 7. Condenser Microphone Bruel&Kjaer 4180 S/N 2889871.

**Calibration Procedure:** CP-102-04 based on IEC 60942-2003; The sound pressure level generated by sound calibrator under test shall be measured by standard microphone using an insert voltage technique.

This instrument has been calibrated against standards maintained at Electrical and Electronic Standards Laboratory (EEL), which are traceable to the International System of Units through the National Institute of Metrology (Thailand).

The information on actual reading is attached herewith and the uncertainty limits quoted refer to the measured values only.

**Date of Receipt** : 6 May 2021  
**Date of Calibration** : 15 May 2021

1/2

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

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

FM.BLMTC.002 Rev.4

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THAILAND INSTITUTE OF SCIENTIFIC AND TECHNOLOGICAL RESEARCH (TISTR)

Request No. 21-64/0528 MTC No. EEL. BP. 17/0564

The reported expanded uncertainty is based upon a standard uncertainty multiplied by a coverage factor k = 2, providing a level of confidence of approximately 95%.

**Nominal Output of Unit Under Test = 94 dB re 20μPa at 1000 Hz**

**Acoustic Output in dB re 20μPa, Corrected to Reference Conditions: 101.325 kPa, 23.0 °C and 50 %RH.**

### 1. Sound Pressure Level

Standard Microphone Type	Measured Sound Pressure Level (dB)	Deviated value (dB)	Uncertainty (dB)	Tolerance limit IEC60942:2003 Class 1
1/2 inch Bruel&Kjaer 4180	93.96	-0.04	± 0.10	±0.40 dB

### 2. Frequency

Standard Microphone Type	Measured Frequency (Hz)	Deviated value (Hz)	Uncertainty (Hz)	Tolerance limit IEC60942:2003 Class 1
1/2 inch Bruel&Kjaer 4180	999.9	-0.1	± 1.5	±1.0%

### 3. Total Distortion

Standard Microphone Type	Measured Total Distortion (%)	Uncertainty (%)	Tolerance limit IEC60942:2003 Class 1
1/2 inch Bruel&Kjaer 4180	1.26	± 0.50	±3.0%

**Note :** 1. No adjustment.

2. The calibrator pressure correction was not included.

3. The microphone volume correction was not included.

**Calibrated by :**

.....  
(N

**Approved by :**

.....

**Date of Calibration** : 15 May 2021

**Date of Issue** : 18 May 2021

**Electrical and Electronic Standards Laboratory**  
**Industrial Metrology and Testing Service Centre**

Ref : 2011264050601894002

End of Certificate

2 / 2

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Noise B\_111/22

### Sound Level Meter Calibration Report

#### Acoustic Calibrator Data

Brand	ACO	Number	AC 03/56
Model	2127	Serial No.	130006
Calibration Range	94 dB, 1000 Hz	Last Calibration	15 May 2021
		Due Date	15 May 2022

#### Calibration Data

Sound Level Meter Data				Calibration Data		
SLM No.	Brand	Model	Serial No.	Date	Actual Reading [dB]	
					Before Adjustment	After Adjustment
ACO-B05	ACO	6236	00142002	01 March 2022	93.9	94.0
Acoustic Certified Value : Thailand Institute of Scientific and Technological Research (TISTR)					93.96 ± 0.40 dB	



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Noise B\_113/22

### Sound Level Meter Calibration Report

#### Acoustic Calibrator Data

Brand	ACO	Number	AC 03/56
Model	2127	Serial No.	130006
Calibration Range	94 dB, 1000 Hz	Last Calibration	15 May 2021
		Due Date	15 May 2022

#### Calibration Data

Sound Level Meter Data				Calibration Data		
SLM No.	Brand	Model	Serial No.	Date	Actual Reading [dB]	
					Before Adjustment	After Adjustment
ACO-B14	ACO	6236	00172034	01 March 2022	93.9	94.0
ACO-B24	ACO	6236	00182005	01 March 2022	93.9	94.0
Acoustic Certified Value : Thailand Institute of Scientific and Technological Research (TISTR)					93.96 ± 0.40 dB	



Noise B\_123/22

## Sound Level Meter Calibration Report

### Acoustic Calibrator Data

Brand	ACO	Number	AC 03/56
Model	2127	Serial No.	130006
Calibration Range	94 dB, 1000 Hz	Last Calibration	15 May 2021
		Due Date	15 May 2022

### Calibration Data

Sound Level Meter Data				Calibration Data		
SLM No.	Brand	Model	Serial No.	Date	Actual Reading [dB]	
					Before Adjustment	After Adjustment
ACO-B33	ACO	6236	00182015	01 March 2022	94.0	94.0
ACO-B41	ACO	6236	00192032	01 March 2022	94.0	94.0
Acoustic Certified Value : Thailand Institute of Scientific and Technological Research (TISTR)					93.96 ± 0.40 dB	

**เอกสารแนบ 5-3**

เอกสารสอบเทียบเครื่องมือตรวจวิเคราะห์คุณภาพน้ำ

**QUALITY CALIBRATION CO.,LTD.**

235 Petchkasem 63/2 Road, Laksong, Bangkai, Bangkok 10160

Tel (662) 421-5402, (662) 444-0152-3, Fax (662) 809-4584

CERTIFICATE No : 21E3943  
REFERENCE No : 60857-1

PAGE : 1 OF 3

**Certificate of Calibration**

EQUIPMENT : pH METER

MANUFACTURER : HANNA

MODEL : HI 3512

SERIAL No : TH118035

ID No : PH 04/56

CONDITION AS RECEIVED : USED ITEM

SUBMITTED BY : S.P.S. CONSULTING SERVICE CO., LTD.  
7 SOI PHAHOLYOTHIN 24, PHAHOLYOTHIN RD.,  
JOMPOL, CHATUCHAK, BANGKOK 10900

CALIBRATED BY : ATSAWIN Y.

CALIBRATION DATE : 20-Apr-21

APPROVED BY : 

ISSUED DATE : 20-Apr-21

RECEIVED DATE : 09-Apr-21

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

F-G010 REV 02

**QUALITY CALIBRATION CO.,LTD.**

235 Petchkasem 63/2 Road, Laksong, Bangkai, Bangkok 10160

Tel (662) 421-5402, (662) 444-0152-3, Fax (662) 809-4584

CERTIFICATE No : 21E3943

PAGE : 2 OF 3

**Calibration Report**

EQUIPMENT : pH METER

MANUFACTURER : HANNA

ID No : PH 04/56

RECEIVED DATE : 09-Apr-21

AMBIENT TEMPERATURE : 20 °C ± 1 °C

MODEL : HI 3512

SERIAL NUMBER : TH118035

CALIBRATION DATE : 20-Apr-21

RELATIVE HUMIDITY : 50 % RH ± 10% RH

**CONDITION OF THIS RESULTS OF CALIBRATION**

- THIS INSTRUMENT WAS CALIBRATED BY DIRECT MEASUREMENT METHOD BASED ON WI-TQ-062 AND WI-TQ-063. THE DISPLAY UNIT WAS TESTED BY GENERATING STANDARD VOLTAGE TO THE UNIT AND READ THE VALUE COMPARED WITH CALCULATED VALUE. THE DISPLAY AND ELECTRODE WAS CALIBRATED BY USING STANDARD pH BUFFER
- REFERENCE STANDARD INSTRUMENTS :-

INSTRUMENT	MODEL	SERIAL No	CERTIFICATE No / LOT No	DUE DATE
1) pH STANDARD SOLUTION	00651-36	CC639097	4956-10686748	05-Sep-21
2) pH STANDARD SOLUTION	00651-38	CC646738	4957-10828986	25-Oct-21
3) pH STANDARD SOLUTION	00651-40	CC635214	4958-10640234	13-Aug-21
4) PROCESS CALIBRATOR	744	7514008	20E1318	10-May-21
5) BATH	260014	1247 48074	20T9392	10-Sep-21
6) THERMOMETER WITH PROBE	421504	55000379	20T9616	10-Sep-21

- THIS RESULT WAS FOUND ACCURATE AS SHOWN ON DATE AND PLACE OF CALIBRATION ONLY.
- THIS RESULT EXCLUDE LONG TERM STABILITY OF THE UNIT UNDER CALIBRATION.
- THIS CERTIFICATE IS TRACEABLE TO SI UNIT MAINTAINED AT :-
  - NATIONAL INSTITUTE OF STANDARD AND TECHNOLOGY, USA.
  - NATIONAL INSTITUTE OF METROLOGY (THAILAND)

**RESULT OF CALIBRATION : ADJUSTMENT****1. DISPLAY UNIT ONLY**

SLOPE FACTOR k = 2.303 RT/F = 59 mV/pH

mV APPLIED	UUC READING (mV)	CORRECTION (mV)	UUC READING (pH)	UNCERTAINTY OF MEASUREMENT (± mV)	COVERAGE FACTOR k
414.11	414.8	-0.69	-0.43	0.14	2.0
354.95	355.6	-0.65	0.62	0.14	2.0
295.80	296.4	-0.60	1.68	0.14	2.0
236.64	237.2	-0.56	2.73	0.14	2.0
177.48	177.9	-0.42	3.79	0.14	2.0
118.32	118.8	-0.48	4.84	0.14	2.0
59.16	59.6	-0.44	5.89	0.14	2.0
0.00	0.4	-0.40	6.95	0.14	2.0
-59.16	-58.8	-0.36	7.99	0.14	2.0
-118.32	-117.9	-0.42	9.03	0.14	2.0
-177.48	-177.1	-0.38	10.07	0.14	2.0
-236.64	-236.3	-0.34	11.08	0.14	2.0
-295.80	-295.5	-0.30	12.09	0.14	2.0
-354.95	-354.7	-0.25	13.10	0.14	2.0
-414.11	-413.9	-0.21	14.11	0.14	2.0

END OF CALIBRATION REPORT PAGE 2 OF 3



# QUALITY CALIBRATION CO.,LTD.

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

CERTIFICATE No : 21E3943

PAGE : 3 OF 3

## Calibration Report

### RESULT OF CALIBRATION (CONTINUE) :

#### 2. DISPLAY UNIT WITH pH ELECTRODE S/N: 061416CM

STANDARD pH BUFFER SOLUTION (pH)	UUC READING (pH)	CORRECTION (pH)	VALUE BEFORE ADJUSTMENT	UNCERTAINTY OF MEASUREMENT ( $\pm$ pH)	COVERAGE FACTOR k
4.007	4.008	-0.001	4.018	0.012	2.0
6.992	7.001	-0.009	6.888	0.012	2.0
10.016	10.011	0.005	10.027	0.014	2.0

#### 3. PERCENT SLOPE 90%

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 APPROXIMATELY 95%.

END OF CALIBRATION REPORT





TECHNOLOGY PROMOTION ASSOCIATION (THAILAND-JAPAN)  
CALIBRATION AND TESTING EQUIPMENT SERVICES

534/4 PATTANAKARN ROAD SOI 18, SUANLUANG, SUANLUANG BANGKOK 10250

TEL. 0-2717-3000-24 FAX. 0-2719-9484

Cert.No.: 20CH747

Page.: 1 of 2

## Certificate of Calibration

**Equipment :** Turbidity Meter  
**Manufacturer :** Eutech  
**Model :** Cyberscan WL TB1000  
**Serial No. :** 201802206  
**ID. No. :** TB 03/61  
**Condition As-Received:** Used Item  
**Received Date :** 26 May 2020  
**Calibration Date :** 27 May 2020  
**Reference :** 2005-0839WN-1  
**Submitted by :** S.P.S. Consulting Service Co.,Ltd.  
7 Soi Phaholyothin 24, Phaholyothin Rd.,  
Jompol, Chatuchak, Bangkok 10900

**Ambient Temperature :** (25 ± 2.5) °C  
**Relative Humidity :** (50 ± 20) %  
**Calibration Procedure :** In - house method : CP-CH11  
based on direct measurement by  
using Formazin standard solution

**Calibrated by :** Walalak Sirithean

**Approved by :**

( ) Pornthippa Tameyakul  
( ✓ ) Malee Butkruea  
( ) Saithip Meangmai

**Issue Date :** 2 June 2020

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 Calibration and Testing Equipment Services.

A 0004697



Cert.No. : 20CH747

Page. : 2 of 2

### Condition of this calibration result

1. Reference Standard Instruments :

This certification is traceable to the International System of unit through the reference standards  
laboratory of Industrial Calibration Center, Technology Promotion Association (Thailand-Japan).

Instruments	Model	Serial No.	ID No.	Certificate No.	Due date
1) Thermo-Hygrograph	NSII-Q	1103328	130EC010	19H1780	9 July 2020
2) Electronic Balance	AE200S	N03679	140RC001	19MM505	3 Oct 2020

2. Standard Material : The Formazin suspension has been prepared gravimetric from

Material	Manufacturer	Lot No.	Assay
1) Hexamethylenetetramine	HIMEDIA	0000343342	99.5%
2) Hydrazinium Sulfate	HIMEDIA	0000332928	99.2%

3. This certificate is valid only to the item calibrated on date and place of calibration.

### Calibration result

Performing three - Formazin suspension standard curve by using 0,10,1000 NTU  
Turbidity Meter Serial Number : 201802206

Standard Formazine suspension ( NTU )	UUC* Reading ( NTU )	Uncertainty of Measurement ( ± NTU )	Coverage Factor k
20	19.1	0.39	2.00
40	39.5	0.40	2.00
100	99.1	0.71	2.00
400	392	1.5	2.00

### Remark

- UUC\* = Unit Under Calibration  
- NTU = Nephelometric Turbidity Units

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%.

-o0o-

a 1001499



CERTIFICATE No : 21E3592  
REFERENCE No : 60760-1

PAGE : 1 OF 2

## Certificate of Calibration

EQUIPMENT : CONDUCTIVITY METER  
MANUFACTURER : EUTECH  
MODEL : CON 150  
SERIAL No : 2746308  
ID No : CD 04/61  
CONDITION AS RECEIVED : USED ITEM  
SUBMITTED BY : S.P.S. CONSULTING SERVICE CO., LTD.  
7 SOI PHAHOLYOTHIN 24, PHAHOLYOTHIN RD.,  
JOMPOL, CHATUCHAK, BANGKOK 10900

CALIBRATED BY : ATSAWIN Y.  
CALIBRATION DATE : 02-Apr-21

APPROVED BY : [Signature]  
ISSUED DATE : [Signature]  
RECEIVED DATE : 31-Mar-21

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



CERTIFICATE No : 21E3592

PAGE : 2 OF 2

## Calibration Report

EQUIPMENT : CONDUCTIVITY METER  
MANUFACTURER : EUTECH  
SERIAL NUMBER : 2746308  
RECEIVED DATE : 31-Mar-21  
AMBIENT TEMPERATURE : 20 °C ± 1 °C  
MODEL : CON 150  
ID No : CD 04/61  
CALIBRATION DATE : 02-Apr-21  
RELATIVE HUMIDITY : 50 % RH ± 15% RH

### CONDITION OF THIS RESULTS OF CALIBRATION

1. THIS INSTRUMENT WAS CALIBRATED BY DIRECT MEASUREMENT METHOD. THE DISPLAY AND ELECTROD WAS CALIBRATED BY USING STANDARD CONDUCTIVITY BUFFER SOLUTION IN CONTROLLED TEMPERATURE BATH.
2. REFERENCE STANDARD INSTRUMENTS :-

INSTRUMENT	MODEL	LOT No	CERTIFICATE No	DUE DATE
1) REFERENCE MATERIAL	00652-26	CC20562	4066-11793752	09-Dec-21
2) REFERENCE MATERIAL	00652-30	CC20458	4173-11692041	04-Nov-21
3) REFERENCE MATERIAL	00652-32	CC20466	4068-11695401	05-Nov-21
4) REFERENCE MATERIAL	00652-34	CC20523	4069-11762897	01-Dec-21
5) BATH	260014	1247 48074	20T9392	10-Sep-21
6) STANDARD THERMOMETER	421504	55000379	20T9616	10-Sep-21

3. THIS RESULT WAS FOUND ACCURATE AS SHOWN ON DATE AND PLACE OF CALIBRATION ONLY.
4. THIS RESULT EXCLUDE LONG TERM STABILITY OF THE UNIT UNDER CALIBRATION.
5. THIS CERTIFICATE IS TRACEABLE TO :-
  - NATIONAL INSTITUTE OF STANDARDS AND TECHNOLOGY (NIST), USA.
  - NATIONAL INSTITUTE OF METROLOGY (THAILAND)

### RESULT OF CALIBRATION : WITHOUT ADJUSTMENT

#### 1. DISPLAY UNIT WITH ELECTROD S/N CONSEN91W

CONDUCTIVITY BUFFER SOLUTION	UUC READING	CORRECTION	VALUE BEFORE ADJUSTMENT	UNIT	UNCERTAINTY OF MEASUREMENT (±)	COVERAGE FACTOR k
99.0	99.4	-0.40	N/A	µS/cm	3.0	2.0
1413.0	1413	0.00	N/A	µS/cm	30	2.0
9.992	9.55	0.44	N/A	mS/cm	0.21	2.0
99.915	80.3	19.62	N/A	mS/cm	2.1	2.0

#### 2. DISPLAY UNIT WITH TEMPERATURE

STANDARD READING (°C)	UUC READING (°C)	CORRECTION	VALUE BEFORE ADJUSTMENT	UNCERTAINTY OF MEASUREMENT (±°C)	COVERAGE FACTOR k
25.003	25.0	0.0	N/A	0.0085	2.0

UUC : UNIT UNDER CALIBRATION

THE REPORTED UNCERTAINTY OF MEASUREMENT WAS BASED ON A STANDARD UNCERTAINTY MULTIPLIED BY A COVERAGE FACTOR SHOWN IN THE TABLE, PROVIDING A LEVEL OF CONFIDENCE APPROXIMATELY 95%.

END OF CALIBRATION REPORT






CERTIFICATE No : 21M3167  
REFERENCE No : 60627-3

PAGE : 1 OF 2

### Certificate of Calibration

EQUIPMENT : DIGITAL BALANCE  
MANUFACTURER : SARTORIUS  
MODEL : BSA224S-CW  
SERIAL No : 36591843  
ID No : BA 09/61  
CONDITION AS RECEIVED : USED ITEM  
SUBMITTED BY : S.P.S. CONSULTING SERVICE CO., LTD.  
7 SOI PHAHOLYOTHIN 24, PHAHOLYOTHIN RD.,  
JOMPOL, CHATUCHAK, BANGKOK 10900

CALIBRATED BY : ATSAWIN Y.  
CALIBRATION DATE : 19-Mar-21  
APPROVED BY :   
ISSUED DATE : 20-Mar-21  
RECEIVED DATE : 19-Mar-21

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



CERTIFICATE No : 21M3167

PAGE : 2 OF 2

### Calibration Report

EQUIPMENT : DIGITAL BALANCE  
MANUFACTURER : SARTORIUS  
ID No : BA 09/61  
AIR PRESSURE : 1009mbar  $\pm$  1mbar  
AMBIENT TEMPERATURE : 24°C  $\pm$  1°C  
MODEL : BSA224S-CW  
S/N : 36591843  
RECEIVED DATE : 19-Mar-21  
CALIBRATION DATE : 19-Mar-21  
RELATIVE HUMIDITY : 52 %RH  $\pm$  10 % RH

#### CONDITION OF THIS RESULTS OF CALIBRATION

1. THIS INSTRUMENT WAS CALIBRATED BY ACCORDING TO UKAS LAB 14 EDITION 6:2019 BY USING KNOWN WEIGHT STANDARD WEIGHT. THE BALANCE WAS ADJUSTED USING WEIGHT OF QUALITY CALIBRATION TO ADJUST. THE BALANCE HAS NO ZERO TRACKING FUNCTION. REPEATABILITY WAS MEASURED BY USING 10 REPEATED MEASUREMENTS. LINEARITY WAS MEASURED COVERING 10 POINTS, EVENLY SPREAD OVER THE RANGE. THE INSTRUMENT WAS SET ZERO BEFORE PERFORMING THE LINEARITY TEST. OFF-CENTER LOADING WAS MEASURED BY USING STANDARD WEIGHTS PLACED ON THE PAN AND MOVED TO VARIOUS POSITIONS ON THE PAN.

#### 2. REFERENCE STANDARD INSTRUMENTS :-

INSTRUMENT	MODEL	SERIAL No	CERTIFICATE No	DUE DATE
1) STANDARD WEIGHT SET	E2	QK-I-151	C02210415	09-Feb-23
2) STANDARD WEIGHT	E2	15843	C02210419	10-Feb-23
3) STANDARD WEIGHT	E2	QK-I-349	M2103235S	26-Mar-23

3. THIS RESULT WAS FOUND ACCURATE AS SHOWN ON DATE AND PLACE OF CALIBRATION ONLY.

4. THIS RESULT EXCLUDE LONG TERM STABILITY OF THE UNIT UNDER CALIBRATION.

5. THIS CERTIFICATE IS TRACEABLE TO THE INTERNATIONAL SYSTEM OF UNIT MAINTAINED AT:-

- NATIONAL INSTITUTE OF METROLOGY (THAILAND) THROUGH CENTRAL BUREAU OF WEIGHTS&MEASURES

#### RESULT OF CALIBRATION :- WITHOUT ADJUSTMENT

1. ZERO SETTING FUNCTION : NORMAL
2. TARE FUNCTION : NORMAL
3. REPEATABILITY OF READING AT 200 g WAS 0.000045 g
4. DEPARTURE FROM NOMINAL VALUE/ LINEARITY

NOMINAL VALUE (g)	BALANCE READING (g)	CORRECTION (g)	UNCERTAINTY ( $\pm$ g)
0.0	0.0000	0.0000	0.000075
0.1	0.1000	0.0000	0.000075
0.2	0.2000	0.0000	0.000076
0.5	0.5000	0.0000	0.000076
1.0	1.0000	0.0000	0.000077
2.0	2.0000	0.0000	0.000077
5.0	5.0000	0.0000	0.000079
10.0	10.0000	0.0000	0.000082
20.0	20.0000	0.0000	0.000086
50.0	50.0000	0.0000	0.00013
100.0	100.0001	-0.0001	0.00019
200.0	199.9997	0.0003	0.00032

#### 5. OFF CENTER LOADING ERROR



POINT	READING (g)
1	100.0000
2	100.0000
3	100.0001
4	100.0000
5	99.9999
OFF-CENTER LOADING	0.0001

NOTE: THIS CALIBRATION WAS CARRIED OUT AT THE CUSTOMER'S PLACE AT LABORATORY AREA  
THE REPORTED UNCERTAINTY OF MEASUREMENT WAS BASED ON A STANDARD UNCERTAINTY  
COVERAGE FACTOR  $k=2$ , PROVIDING A LEVEL OF CONFIDENCE APPROXIMATELY 95%.

END OF CALIBRATION REPORT



### Lambda UV Preventive Maintenance (PM)

Company Name:	S.P.S. CONSULTING SERVICE CO., LTD.		
Address:	7, Soi Phaholyothin24, Ladyao, Jatujak, Bangkok		
User Name:	เบญจวรรณ	WO Number:	WO-01108977
Telephone Number:	086-141-2523	PM Number:	5 of 6
Customer Support Engineer:	Kerkkiat Kersil	Certificate Number:	UV5004-2021
Date PM Performed: (DD-MMM-YYYY)	28-Jan-2021	Next PM Due Date: (DD-MMM-YYYY)	28-Jul-2021

#### Scope

The purpose of this PM is to ensure the continued functionality of the PerkinElmer Lambda UV/Vis Spectrophotometer by inspecting and replacing any worn or damaged parts. This service should only be performed by a trained representative of PerkinElmer. The customer should save their method before the PM begins.

#### General Instructions:

The customer must provide the engineer operational data to demonstrate recent instrument performance prior to starting the PM. Always check with the customer before making any changes that may affect the customer's analysis should be signed by an authorized PerkinElmer and customer representative and left with the customer. Update the PM sticker and instrument logbook as required.

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### Component List

Component Specific Model	Serial #	Software Version		Configuration Notes
LAMBDA365	365K7060203	4.1.1	STD	160529
NA	NA	NA	NA	NA

### Parts Lists

Part Number applicable)	(If	Description	Quantity	Batch/L ot/SN#	Expiration Date (MM-YY)
B250 0999	Stray Light Standard				
	NaI	1	1705	Jun-21	
	NaNO2	1	21060		
	KCl	1	31280		
	NA	NA	NA		
RM-1N2N3N	Secondary Standard for calibration of wavelength and photometric accuracy or use NBS/NIST 930 standards				
	Gray Glass G1	1	1882	Jun-21	
	Gray Glass G2	1	1882	Jun-21	
	Gray Glass G3	1	1502	Jun-21	
	Holmium Oxide	1	71789	Apr-22	
	NA	NA	NA		
	NA	NA	NA		

Additional Parts Required for PM					
Part Number (if applicable)	Description	Quantity	Serial #		Remark
NA	NA	NA	NA		NA
NA	NA	NA	NA		NA
NA	NA	NA	NA		NA
Additional Reagents and Standards Required for PM					
Part Number (if applicable)	Description	Quantity	Batch/Lot #		Expiration Date (MM/YY)
NA	NA	NA	NA	NA	NA
NA	NA	NA	NA	NA	NA
NA	NA	NA	NA	NA	NA

## Procedure Checklist

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

### 1. General:

- ☐ Review the instrument performance with the customer and document any recent problems.
- ☐ Inspect the customer log book and make any appropriate PM entries.
- ☐ Perform general inspection of system for cleanliness.

### 2. Optical checks:

- ☐ Lamp Alignment/Energy
- ☐ Sample Compartment Windows/Monochromator
- ☐ Mirror and Grating Alignment
- ☐ Cell Holder Alignment

### 3. Mechanical:

- ☐ Physical inspection – Please write any comments in the additional comments section.
- ☐ Grating Drive Mechanism.
- ☐ Lamp Change Mechanism.
- ☐ Slit Drive Manual Servo.

### 4. Performance Test:

- ☐ D2 Wavelength accuracy

	Actual Value	Specification
Accuracy at 656.1 nm	656.10	± 0.1

☒ Holmium Oxide wavelength accuracy. (Specification  $\pm 0.41$  nm.)

Filter ID #		71789	
Test	Calibration Value	Actual Value	Deviation
278.13	278.13	277.95	-0.18
416.25	416.25	416	-0.25

☒ Stay Light.

Test	Filter ID #	Result	Specification
Nal @ 220 nm	1705	0.0090	< 0.02 %T
NaNO <sub>2</sub> @ 340 nm	21060	0.0051	< 0.02 %T
KCl @ 198 nm	31280	0.1709	< 1 %T

☒ Baseline Flatness.

Corrected Baseline	Specification
0.001600	$\pm 0.002$ A

☒ Noise Test @ 700 nm.

Actual Value	Specification
0.000010	$\pm 0.00005$ A

☒ Photometric Accuracy. (Specification  $\pm 0.0047$  A.)

Filter 1 ID #		1882	
Test	Calibrated Value	Actual Value	Deviation
440 nm	0.3375	0.3364	-0.0011
546.1 nm	0.3053	0.3046	-0.0007
635 nm	0.3271	0.3262	-0.0009
Filter 2 ID #		1882	
Test	Calibrated Value	Actual Value	Deviation
440 nm	0.9898	0.9904	0.0006
546.1 nm	0.9422	0.9426	0.0004
635 nm	0.9380	0.9379	-0.0001
Filter 3 ID #		1502	
Test	Calibrated Value	Actual Value	Deviation
440 nm	0.4969	0.4972	0.0003
546.1 nm	0.4667	0.4670	0.0003
635 nm	0.4818	0.4827	0.0009



**5. Accessory (where applicable):**

- ☐ Integrating Sphere
- ☐ Reflecting Attachment
- ☐ Cell Changer
- ☐ Sipper
- ☐ Auto Sampler


**6. Review:**

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

## Additional Comments

Additional Comments Regarding the PM

## Review

<p><i>The preventive maintenance checks and if applicable performance tests for Lambda UV have been completed.</i></p>	
<p><i>This Lambda UV Passes <input checked="" type="checkbox"/> Fails <input type="checkbox"/> the preventive maintenance.</i></p>	
<p><b>Review of Preventive Maintenance:</b></p>	
	<p>Date:</p> <p>28-Jan-2021 (DD-MMM-YYYY)</p>
	<p>Date:</p> <p>(DD-MMM-YYYY)</p>

<b>PinAAcle 900T Preventive Maintenance (PM)</b>			
<b>Company Name:</b>	S.P.S.CONSULTING SERVICE CO.,LTD		
<b>Address (Instrument Location):</b>	PHAHOLYOTHIN RD, JOMPON, BANGKOK, 51, TH, 10900		
<b>Serial Number:</b>	PTCS14111103	<b>PM Number:</b>	2/2
<b>Customer Name (if applicable):</b>	K.PHENPHA	<b>Telephone Number:</b>	083-926-9252
<b>Customer Support Engineer Name:</b>	K.DUANG	<b>Service Order Number:</b>	WO-01082029
<b>Date PM Performed: (DD-MMM-YYYY)</b>	08-Jan-2021	<b>Next PM Due Date: (DD-MMM-YYYY)</b>	08-Jul-2021
<b>Standard Labor Hours to Complete PM :</b>		<b>5 hours</b>	

Part Number	Release	Publication Date	
09370143 Rev.9	A	January 2018	

#### Scope

The purpose of this PM is to ensure the continued functionality of the PinAAcle 900T by inspecting and replacing any worn or damaged parts. This service should only be performed by a trained representative of PerkinElmer.

The customer should save their method before the PM begins.

#### General Instructions:

The customer must provide the engineer operational data to demonstrate recent instrument performance prior to starting the PM. Always check with the customer before making any changes that may affect the customer's analysis or calibration, including a current back-up of system software and/or data files. The completed document should be signed by an authorized PerkinElmer and customer representative and left with the customer. Update the PM sticker and instrument logbook as required.

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## Component List

Component / Specific Model	Serial #	Configuration Notes
AS900	AS9S14B1002	WINLAB 32

## Parts Lists

Parts Included with the PM		
Part Number (if applicable)	Description	Quantity
B0501696	Fan Filters	2
B3002013	THGA Contact Cylinders	1
B3141064	Glycerol for THGA Cooling	N/A
N3160156	O-Ring Kits for Sampling Introduction ( Stainless Steels Nebulizer)	N/A
N3160157	O-Ring Kits for Sampling Introduction ( Plastic Nebulizer)	2
N9301714	Replacement Acetylene Filter Cartridge	1
TH001022	Replacement Air Filter Cartridge	2

Additional Reagents and Standards Required for PM				
Part Number (if applicable)	Description	Quality	Batch/Lot #	Expired Date (MM/YY)
N9300183	1000 mg/L Copper Standard	AR	24-91CUY1	28-Feb-2021
N9300244	GFAAS Mixed Standard	AR	53-255CRY1	30-Sep-2021

Additional Reagents and Standards Required for PM (Customer Support Solution)				
Part Number (if applicable)	Description	Quantity	Batch/Lot #	Expiration Date (MM/YY)
N/A	DI Water	250 ml.	AR	AR
N/A	0.5% HNO <sub>3</sub>	250 ml.	AR	AR

Additional Tools Required for PM			
Part Number (if applicable)	Description	Quantity	Serial #
N1013000	0.2A Neutral density filter	1	MG0-252
N1013002	1.0A Neutral density filter	1	MG2-358
B3100652 Or N9307029	Electronic Flow Meter	1	PE200767
B0505495	Test Jig	1	NA
03030997	System 2 EDL Driver	1	03030997
N3050605	As System 2 EDL	1	16148
N3050121	Cu Lumina HCL	1	092216-010130
N3050109	Ba Lumina HCL	1	102416-040160
N3050139	K Lumina HCL	1	110716-010060
N3050152	Ni Lumina HCL	1	100516-030190
N3050119	Cr Lumina HCL	1	091911-020150

## Procedure Checklist

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

### 1. General:

- ☒ Review the instrument performance with the customer and document any recent problems.
- ☒ Inspect the customer log book and make any appropriate PM entries.
- ☒ Perform general inspection of system for cleanliness.

### 2. PC Instrument Software:

- ☒ Instrument Software user files/databases archived, packed, and/or deleted as needed.

### 3. Mechanical:

- ☒ Inspect and clean all fans and filters. Replace filters if necessary
- ☒ Inspect all gas and water lines for leaks and/or wear. Replace if needed. Thoroughly inspect all quick connects. Replace the Y connector, P/N 09921079, if needed.
- ☒ Clean exterior of the instrument.

#### 3.1 Flame Technique

- ☒ Inspect the burner head, burner chamber, and nebulizer. Clean if needed as stated in the Hardware Guide.
- ☒ Check burner head dimensions with the feeler gauge as stated in the Hardware Guide in the Maintenance chapter section on cleaning the burner head and checking sloth width. Replace if out of specification
- ☒ Check the condition of the end cap, burner head, and nebulizer O-rings. Replace if necessary.
- ☒ Check the drain system for signs of wear. Replace worn or damaged parts.
- ☒ Visually check for proper flame conditions when igniting the Air-C2H2 and N2O-C2H2 flames (if applicable).

#### 3.2 THGA Technique

- ☒ Inspect the pole pieces and clean where the pole pieces contact the furnace. Replace the pole piece p-rings as needed, P/N's B0501018 & B0501250. Grease the O-rings as needed with Apiezon L grease, P/N 09905148
- ☒ Inspect the four insulation pads on the front contact housing of the THGA in furnace. If the pads are missing replace the THGA furnace or replace the insulator pads on the furnace.
- ☒ Inspect the graphite tube and clean the contact cylinders. Replace if necessary.
- ☒ Check internal and external gas flows with the Electronic Gas Flow Meter and the Gas Flow Test Probe as described in the Service Manual. Correct if necessary.
- ☒ Check furnace open/close function.
- ☒ Verify the operation of the GFTV Camera for proper operation and viewing alignment in the furnace camera Tube View window. Align if needed.
- ☒ Check the operation of the Halogen Light ASSY for the GFTV Camera. Replace if needed.
- ☒ Check the water level/quality in the recirculation (if applicable). Add distilled water if necessary.
- ☒ Check the cooling system fluid flow rate with the FCS In-Line Flow Meter for proper levels if needed. Refer to SDB# COSY008.STN



- ☒ Perform Cooling System maintenance if needed per SDB# COSY005.STN.
- ☒ Check auto sampler operation.
- ☒ Perform an auto sampler check valve test as described in the Service Manual.
- ☒ Lubricate the spindles of the auto sampler pumps and all moving parts of the tray mechanics as described in the Service Manual.
- ☒ Inspect the auto sampler sampling capillary as described in the Service Manual. Replace if necessary.

#### 4. Electrical:

- ☒ Inspect PC boards. Clean if necessary.
- ☒ Carefully check all internal and external cable connections.
- ☒ Check instrument firmware revisions upgrade to current levels (if necessary)
- ☒ Run Diagnostics Test within the Advanced function of the Spectrometer page. Check the results in the service log folder in the Spectrometer BM Log Viewer.

#### 5. Optics:

- ☒ Inspect and clean the sample compartment windows, if needed.
- ☒ Inspect and clean the furnace windows, if needed.
- ☒ Inspect and clean the GFTV camera lens, if needed.
- ☒ Inspect optics. Clean or replace if necessary,

#### 6. Gasses:

- ☒ Verify that the Gasses supplied to the instrument are within the pressure and purity specifications found in the PinAAcle 900 Series Pre-installation Checklist SDB.
- ☒ Verify that the air filter element is dry. Replace if necessary.

#### 7. Flame Interlock Check:

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

Parameter	Specification	Test Results	Pass/Fail
Flame Sensor	Air/C <sub>2</sub> H <sub>2</sub> Flame correctly shuts down	Active	Passed
Drain Sensor	Air/C <sub>2</sub> H <sub>2</sub> Flame correctly shuts down	Active	Passed
Nebulizer Sensor	Air/C <sub>2</sub> H <sub>2</sub> Flame correctly shuts down	Active	Passed
C <sub>2</sub> H <sub>2</sub> Pressure Sensor	Air/C <sub>2</sub> H <sub>2</sub> Flame correctly shuts down	Active	Passed
Air Pressure Sensor	Air/C <sub>2</sub> H <sub>2</sub> Flame correctly shuts down	Active	Passed
Burner Head Sensor	Choosing Nitrous Oxide as the oxidant should trigger an interlock shuts down	Active	Passed

#### 8. After PM Performance tests [Flame]:

##### 8.1 Detector Linearity with Barium

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

Parameter	Specification	Certificate Value at 553.6 nm (Abs.)	Test Results	Pass/Fail
1.0 A ND Filter	± 5% from Cert.	0.9798	0.9775	Passed
0.2 A ND Filter	± 5% from Cert.	0.2042	0.1975	Passed

##### 8.2 Baseline Noise at 1.0 Absorbance with Barium

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

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

##### 8.3 AA Baseline Noise with Copper

Description: Check baseline noise.

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

##### 8.4 D<sub>2</sub> Background Compensation with Copper

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

Parameter	Specification	Results	Pass/Fail
Standard Deviation	≤ 0.010	0.0054	Passed

##### 8.5 AA-BG Baseline Noise with Copper

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

Parameter	Specification	Results	Pass/Fail
Standard Deviation	≤ 0.005	0.0002	Passed

#### 8.6 AA-BG Baseline Noise with Arsenic

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

Parameter	Specification	Results	Pass/Fail
Standard Deviation	$\leq 0.005$	0.0011	Passed

#### 8.7 Flame Sensitivity

Description: Instrument Sensitivity checked against Copper standard.

Standard Copper Sensitivity	Specification	Results (Abs.)	Pass/Fail
5 mg/L Sensitivity SS Neb (if applicable)	$> 0.250$ Abs.	NA	Not Applicable
2 mg/L Sensitivity HS Neb (if applicable)	$> 0.250$ Abs.	0.3475	Passed

### 9. After PM Performance tests [THGA]:

#### 9.1 Furnace Gas Flows

Description: Ensures the flow rates are within specification.

Parameter	Specification	Test Results	Pass/Fail
Internal Flow Rate	250 mL/min $\pm$ 25 mL/min	255	Passed
External Flow Rate	100 mL/min $\pm$ 10 mL/min	103	Passed

#### 9.2 Chromium Baseline Noise

Description: Signal to noise check.

Parameter	Specification	Results	Pass/Fail
Baseline Noise	$\leq 0.005$ Abs.	-0.0001	Passed
Standard Deviation	$\leq 0.005$	0.0003	Passed

#### 9.3 Chromium Characteristic Mass and Precision

Description: Calculate the characteristic mass using the characteristic mass tool and precision from the integrated absorbance values.

Parameter	Specification	Results	Pass/Fail
Cr $m_0$ Results	$\leq 7.0$ pg/0.0044 A-s	5.3	Passed
Precision	$\leq 2.0$ %	1.71	Passed

#### 9.4 Copper Characteristic Mass and Zeeman Ratio

Description: Calculate the characteristic mass using the characteristic mass tool and check the Zeeman Ratio.

Parameter	Specification	Results	Pass/Fail
Cu $m_0$ Result	$\leq 16.5$ pg/0.0044 A-s	11.4	Passed
Zeeman Ratio	$0.52 \pm 0.04$	0.52	Passed

### 10. Review:

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

### Additional Comments

### Additional Comments Regarding the PM

$$\begin{aligned} \text{Zeeman Ratio} &= \frac{\text{Atomic Signal (Peak area)}}{\text{Atomic Signal (Peak area)} + \text{Background Signal (Peak area)}} \\ &= \frac{0.1967}{0.1967+0.1807} \\ &= 0.52 \end{aligned}$$

## Review

*The preventive maintenance checks and if applicable performance tests for PinAAcle 900T have been completed.*

This PinAAcle 900T **Passes** ☒ **Fails** ☐

Review of Preventive Maintenance:

Authorized PerkinElmer Representative

Authorized Customer Representative:



## MAINTENANCE REPORT

### OPTIMA 5300DV

<b>Customer :</b>	S.P.S. CONSULTING SERVICE CO., LTD.	<b>Date Tested:</b>	January 18, 2021
<b>Address :</b>	7 Soi Phaholyothin 24 Phaholyothin Road., Jompol, Chatuchak, Bangkok 10900	<b>Recommendation Recertification</b>	
<b>User Name:</b>	Phenpha Vipasthawatt	<b>Period</b>	6 Months
<b>Phone:</b>	0-2939-4370-72	<b>Recertification Due:</b>	July 18, 2021
<b>Fax:</b>	0-2513-4221	<b>Date Last Certified:</b>	July 21, 2020
		<b>Visit Number:</b>	2 of 2
		<b>PerkinElmer Phone:</b>	02-719-6420 ext 206
		<b>PerkinElmer Fax:</b>	02-318-5597

CONFIGURATION TESTED		ACCESSORIES/COMPONENT NOT INCLUDED
<b>MODEL</b>	<b>SERIAL NUMBER</b>	
OPTIMA 5300DV	077C7042401	
<b>TESTED EQUIPMENT</b>	<b>CALIBRATION NUMBER</b>	<b>EXPIRATION</b>
IPV Methods		
<b>TEST STANDARD USED</b>	<b>PART NUMBER</b>	<b>EXPIRATION DATE</b>
Multielement Standard	N069-1579	February 28, 2022
Wavecal Solution	N058-2152	January 30, 2022
VIS Wavecal solution	N930-2946	December 30, 2021
Instrument Cal. STD4	N930-0221	June 30, 2021
<b>CUSTOMER SUPPLIED</b>	<b>COMMENTS</b>	<b>CUSTOMER INITIALS</b>
2 % HNO3		
10 % HNO3		



## MAINTENANCE REPORT

### OPTIMA 5300DV

<b>SERIAL NUMBER</b>	077C7042401	<b>DATE TESTED</b>	January 18, 2021
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- MECHANICAL CHECKS**
  - A. Inspect and clean all fans and filters. ☐ OK
  - B. Inspect and replace as necessary, all torch components including the RF coil. ☐ OK
  - C. Inspect all tubing for sign of clacking or leaking. ☐ OK
  - D. Adjust water and gas pressure regulator settings. ☐ OK
  - E. Inspect and leak check pneumatics drawers. ☐ OK
  - F. Clean the exterior of the instrument. ☐ OK
- 2. OPTICAL CHECKS**
  - A. Inspect and clean all optical components. ☐ OK
  - B. As required, check and replace all purgefilters. ☐ OK
  - C. Recheck optical alignment. ☐ OK
- 3. COOLING SYSTEM CHECKS**
  - A. Perform preventive maintenance on chiller. ☐ OK
  - B. Flush out the chiller every six months. ☐ OK
- 4. PERFORMANCE CHECKS**
  - A. Torch View Alignment. ☐ OK
  - B. Wavelength Calibration. ☐ OK





## MAINTENANCE REPORT OPTIMA 5300DV

SERIAL NUMBER : 077C7042401      DATE TESTED : January 18, 2021

PARAMETER	SPECIFICATION		FINAL VALUE
Spectral Resolution : UV	As 193.696 nm	≤ 0.007	0.00592
	Ni 231.604 nm	≤ 0.008	0.00771
	Ni 341.476 nm	≤ 0.012	0.00792
Spectral Resolution : VIS	La 408.672 nm	≤ 0.020	0.01605
	Ba 455.403 nm	≤ 0.025	0.02172
Precision	As 193.656 nm	% RSD < 1.0	0.55 %
	Zn 213.856 nm	% RSD < 1.0	0.58 %
	Mn 257.610 nm	% RSD < 1.0	0.46 %
	La 379.478 nm	% RSD < 1.0	0.36 %
	Ba 455.403 nm	% RSD < 1.0	0.6 %
	Ba 493.408 nm	% RSD < 1.0	0.74 %
Detection Limits : Axial	Tl 190.800 nm	3(sd)	1.92 ppb
	As 193.696 nm	3(sd)	3.64 ppb
	Pb 220.353 nm	3(sd)	1.20 ppb
Detection Limits : Radial	As 193.696 nm	3(sd)	34.30 ppb
	Zn 213.856 nm	3(sd)	1.66 ppb
	Mn 257.610 nm	3(sd)	1.87 ppb
	La 379.478 nm	3(sd)	0.82 ppb
	Ba 455.403 nm	3(sd)	0.14 ppb
	Ba 493.408 nm	3(sd)	0.15 ppb
BEC : Axial (IB X 5000)/(IS-IB)	Cd 226.502 nm	≤ 150 ppb	28.94 ppb
BEC : Radial (IB X 1000)/(IS-IB)	Mn 257.610 nm	≤ 45 ppb	27.84 ppb



## MAINTENANCE REPORT OPTIMA 5300DV

SERIAL NUMBER 077C7042401      DATE TESTED January 18, 2021

### Remarks :

Commissioning follow as commissioning performance sheets.

This is to certify that the above tests have been performed and the configuration tested

☒

meets

☐

does not meet

the PerkinElmer Specifications listed on this certificate.

This certificate does not modify PerkinElmer's standard terms and condition of sale,  
including warranty terms.

Service De [REDACTED] ner Ltd.

Authorized Representative: \_\_\_\_\_

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