ภาคผนวก ง-1

เอกสารรับรองห้องปฏิบัติการวิเคราะห์เอกชน

บริษัท เอส.พี.เอส. คอนซัลติ้ง เซอร์วิส จำกัด

ที่ อก ๐๓๑๐(๑)/ ๑๔๓๒๑

กรมโรงงานอุตสาหกรรม
ถนนพระรามที่ ๖ แขวงทุ่งพญาไท
เขตราชเทวี กรุงเทพฯ ๑๐๔๐๐

๑๑ ตุลาคม ๒๕๖๖

เรื่อง ต่ออายุหนังสือรับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน

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

อ้างถึง คำขอขึ้นทะเบียน/ต่ออายุ/เปลี่ยนแปลงบุคลากร และชนิดสารมลพิษของห้องปฏิบัติการวิเคราะห์เอกชน ลงวันที่ ๒๒ มิถุนายน ๒๕๖๖

สิ่งที่ส่งมาด้วย ๑. รายชื่อผู้ควบคุมดูแลห้องปฏิบัติการวิเคราะห์ จำนวน ๑ แผ่น
๒. รายชื่อเจ้าหน้าที่ประจำห้องปฏิบัติการวิเคราะห์ จำนวน ๒ แผ่น
๓. ขอบข่ายสารมลพิษที่ได้รับขึ้นทะเบียนจากกรมโรงงานอุตสาหกรรม จำนวน ๓๔ แผ่น

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

กรมโรงงานอุตสาหกรรมพิจารณาแล้ว ให้บริษัท เอส.พี.เอส. คอนซัลติ้ง เซอร์วิส จำกัด ต่ออายุหนังสือรับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน โดยมีองค์ประกอบดังนี้

ก. ผู้ควบคุมดูแลห้องปฏิบัติการวิเคราะห์ จำนวน ๓๔ ราย ตามสิ่งที่ส่งมาด้วย ๑
ข. เจ้าหน้าที่ประจำห้องปฏิบัติการวิเคราะห์ จำนวน ๔๗ ราย ตามสิ่งที่ส่งมาด้วย ๒
ค. ขอบข่ายสารมลพิษที่ได้รับขึ้นทะเบียนให้วิเคราะห์ในน้ำเสีย น้ำใต้ดิน อากาศเสีย สิ่งปฏิกูล หรือวัสดุที่ไม่ใช้แล้ว และดิน ตามสิ่งที่ส่งมาด้วย ๓

หนังสือฉบับนี้จะหมดอายุในวันที่ ๑๐ กรกฎาคม ๒๕๖๙ หากประสงค์จะต่ออายุหนังสือรับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน ให้ยื่นคำขอต่ออายุพร้อมเอกสารประกอบคำขอต่อกรมโรงงานอุตสาหกรรมภายใน ๓๐ วัน ก่อนวันสิ้นอายุของหนังสือรับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน ทั้งนี้ สามารถยื่นคำขอผ่านระบบอิเล็กทรอนิกส์ได้ที่หน้าเว็บไซต์กรมโรงงานอุตสาหกรรม

จึงเรียนมาเพื่อทราบ

ขอแสดงความนับถือ

(นายประสม คำรงพงษ์)
ผู้อำนวยการกองวิจัยและเตือนภัยมลพิษโรงงาน
ปฏิบัติราชการแทนอธิบดีกรมโรงงานอุตสาหกรรม

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

สิ่งที่ส่งมาด้วย ๑

เอกสารแนบท้ายหนังสือรับต่ออายุขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน
บริษัท เอส.พี.เอส. คอนซัลติ้ง เซอร์วิส จำกัด เลขทะเบียน ว-๐๑๑
ที่ อก ๐๓๑๐(๑)/ ๑๔๓๒๑ ลงวันที่ ๑๑ ตุลาคม ๒๕๖๖

ก. ผู้ควบคุมดูแลห้องปฏิบัติการวิเคราะห์ จำนวน ๓๔ ราย

[redacted]

เอกสารแนบท้ายหนังสือรับต่ออายุขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน

บริษัท เอส.พี.เอส. คอนซัลติ้ง เซอร์วิส จำกัด เลขทะเบียน ว-๐๑๑

ที่ อก ๐๓๑๐(๑)/ ๑๔๓๒๑ ลงวันที่ ๑๑ ตุลาคม ๒๕๖๖

ข. เจ้าหน้าที่ประจำห้องปฏิบัติการวิเคราะห์ จำนวน ๔๗ ราย

[redacted]

[redacted]

สิ่งที่ส่งมาด้วย ๓

เอกสารแนบท้ายหนังสือรับต่ออายุขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน

บริษัท เอส.พี.เอส. คอนซัลติ้ง เซอร์วิส จำกัด เลขทะเบียน ว-๐๑๑

ที่ อก ๐๓๑๐(๑)/ ๑๔๓๒๑ ลงวันที่ ๑๑ ตุลาคม ๒๕๖๖

ขอบข่ายสารมลพิษที่ได้รับขึ้นทะเบียนจากกรมโรงงานอุตสาหกรรม จำนวน ๓๗๙ รายการ

น้ำเสีย จำนวน 62 รายการ

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
1	Aldicarb	High-Performance Liquid Chromatographic Method[4]
2	Aldicarb Sulfone	High-Performance Liquid Chromatographic Method[4]
3	Aldicarb Sulfoxide	High-Performance Liquid Chromatographic Method[4]
4	Aldrin	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method[4]
5	Arsenic	1) Digestion, Hydride Generation/Atomic Absorption Spectrometric Method[4] 2) Digestion, Inductively Coupled Plasma Method[4]
6	Barium	Digestion, Inductively Coupled Plasma Method[4]
7	α-BHC	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method[4]
8	β-BHC	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method[4]
9	δ-BHC	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method[4]
10	γ-BHC	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method[4]
11	Biochemical Oxygen Demand	1) 5-Day BOD Test, Azide Modification Method[4] 2) 5-Day BOD Test, Membrane Electrode Method[4]
12	Cadmium	1) Digestion, Direct Air-Acetylene Flame Method[4] 2) Digestion, Electrothermal Atomic Absorption Spectrometric Method[4] 3) Digestion, Inductively Coupled Plasma Method[4]

13 Carbaryl...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
13	Carbaryl	High-Performance Liquid Chromatographic Method[4]
14	Carbofuran	High-Performance Liquid Chromatographic Method[4]
15	Chemical Oxygen Demand	1) Open Reflux, Titrimetric method[4] 2) Closed Reflux, Colorimetric method[4] 3) Closed Reflux, Titrimetric Method[4]
16	Chlordane	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method[4]
17	Chromium	1) Digestion, Direct Air-Acetylene Flame Method[4] 2) Digestion, Electrothermal Atomic Absorption Spectrometric Method[4] 3) Digestion, Inductively Coupled Plasma Method[4]
18	Color	ADMI Weighted-Ordinate Spectrophotometric Method[4]
19	Copper	1) Digestion, Direct Air-Acetylene Flame Method[4] 2) Digestion, Inductively Coupled Plasma Method[4]
20	Cyanide	Distillation, Colorimetric method[4]
21	4,4′-DDD	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method[4]
22	4,4′-DDE	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method[4]
23	4,4′-DDT	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method[4]
24	Dieldrin	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method[4]
25	Endosulfan I	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method[4]

26 Endosulfan II...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
26	Endosulfan II	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method[4]
27	Endosulfan Sulfate	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method[4]
28	Endrin	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method[4]
29	Endrin aldehyde	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method[4]
30	Formaldehyde	Distillation, Colorimetric Method[3]
31	Free Chlorine	1) Iodometric Method[4] 2) DPD Colorimetric Method[4]
32	Heptachlor	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method[4]
33	Heptachlor epoxide	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method[4]
34	Hexavalent Chromium	Colorimetric Method[4]
35	3-Hydroxycarbofuran	High-Performance Liquid Chromatographic Method[4]
36	Lead	1) Digestion, Direct Air-Acetylene Flame Method[4] 2) Digestion, Electrothermal Atomic Absorption Spectrometric Method[4] 3) Digestion, Inductively Coupled Plasma Method[4]
37	Malathion	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method[4]
38	Manganese	1) Digestion, Direct Air-Acetylene Flame Method[4] 2) Digestion, Inductively Coupled Plasma Method[4]
39	Mercury	Digestion, Cold-Vapor Atomic Absorption Spectrometric Method[4]

40 Methiocarb...

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

56 Total Kjeldahl Nitrogen...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
56	Total Kjeldahl Nitrogen	Macro-Kjeldahl Method[4]
57	Total Phosphorous	Digestion, Colorimetric Method[4]
58	Total Suspended Solids	Dried at 103-105 °C[4]
59	Toxaphene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method[4]
60	Trivalent Chromium	Digestion, Inductively Coupled Plasma Method; Colorimetric Method; Calculation[4]
61	Turbidity	Nephelometric Method[4]
62	Zinc	1) Digestion, Direct Air-Acetylene Flame Method[4] 2) Digestion, Inductively Coupled Plasma Method[4]

น้ำใต้ดิน จำนวน 126 รายการ

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
1	Acenaphthene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method[4]
2	Acetone	Purge and Trap Gas Chromatographic/ Mass Spectrometric Method[4]
3	Aldrin	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method[4]
4	Anthracene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method[4]
5	Antimony	Digestion, Inductively Coupled Plasma Spectrometric Method[4]
6	Arsenic	1) Digestion, Hydride Generation/Atomic Absorption Spectrometric Method[4] 2) Digestion, Inductively Coupled Plasma Method[4]
7	Atrazine	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method[4]

8 Barium...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
8	Barium	Digestion, Inductively Coupled Plasma Spectrometric Method[4]
9	Benz(a)anthracene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method[4]
10	Benzene	Purge and Trap Gas Chromatographic/ Mass Spectrometric Method[4]
11	Benzo(b)fluoranthene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method[4]
12	Benzo(k)fluoranthene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method[4]
13	Benzoic acid	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method[4]
14	Benzo(a)pyrene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method[4]
15	Benzo(g,h,i)perylene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method[4]
16	Beryllium	Digestion, Inductively Coupled Plasma Spectrometric Method[4]
17	Bis(2-chloroethyl)ether	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method[4]
18	Bis(2-ethylhexyl)phthalate	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method[4]
19	Bromodichloromethane	Purge and Trap Gas Chromatographic/ Mass Spectrometric Method[4]
20	Bromoform	Purge and Trap Gas Chromatographic/ Mass Spectrometric Method[4]
21	Butanol	Purge and Trap Gas Chromatographic/ Mass Spectrometric Method[4]
22	Butyl benzyl phthalate	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method[4]
23	Cadmium	Digestion, Inductively Coupled Plasma Spectrometric Method[4]

24 Carbazole...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
24	Carbazole	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method[4]
25	Carbon disulfide	Purge and Trap Gas Chromatographic/ Mass Spectrometric Method[4]
26	Carbon tetrachloride	Purge and Trap Gas Chromatographic/ Mass Spectrometric Method[4]
27	Chlordane	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method[4]
28	p-Chloroaniline	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method[4]
29	Chlorobenzene	Purge and Trap Gas Chromatographic/ Mass Spectrometric Method[4]
30	Chlorodibromomethane	Purge and Trap Gas Chromatographic/ Mass Spectrometric Method[4]
31	Chloroform	Purge and Trap Gas Chromatographic/ Mass Spectrometric Method[4]
32	2-Chlorophenol	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method[4]
33	Chromium	1) Digestion, Direct Air-Acetylene Flame Method[4] 2) Digestion, Electrothermal Atomic Absorption Spectrometric Method[4] 3) Digestion, Inductively Coupled Plasma Spectrometric Method[4]
34	Chromium (III)	Digestion, Inductively Coupled Plasma Spectrometric Method; Colorimetric Method; Calculation[4]
35	Chromium (VI)	Colorimetric Method[4]
36	Chrysene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method[4]
37	Cyanide	Distillation, Colorimetric Method[4]

38 2,4-D...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
38	2,4-D	Liquid-Liquid Extraction, Gas Chromatographic Method[4]
39	DDD	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method[4]
40	DDE	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method[4]
41	DDT	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method[4]
42	Dibenz(a,h)anthracene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method[4]
43	Di-n-butyl phthalate	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method[4]
44	1,2-Dichlorobenzene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method[4]
45	1,3-Dichlorobenzene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method[4]
46	1,4-Dichlorobenzene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method[4]
47	3,3′-Dichlorobenzidine	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method[4]
48	1,1-Dichloroethane	Purge and Trap Gas Chromatographic/ Mass Spectrometric Method[4]
49	1,2-Dichloroethane	Purge and Trap Gas Chromatographic/ Mass Spectrometric Method[4]
50	1,1-Dichloroethylene	Purge and Trap Gas Chromatographic/ Mass Spectrometric Method[4]
51	cis-1,2-Dichloroethylene	Purge and Trap Gas Chromatographic/ Mass Spectrometric Method[4]
52	trans-1,2-Dichloroethylene	Purge and Trap Gas Chromatographic/ Mass Spectrometric Method[4]
53	2,4-Dichlorophenol	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method[4]

54 1,2-Dichloropropane...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
54	1,2-Dichloropropane	Purge and Trap Gas Chromatographic/ Mass Spectrometric Method[4]
55	1,3-Dichloropropane	Purge and Trap Gas Chromatographic/ Mass Spectrometric Method[4]
56	1,3-Dichloropropene	Purge and Trap Gas Chromatographic/ Mass Spectrometric Method[4]
57	Dieldrin	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method[4]
58	Diethyl phthalate	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method[4]
59	2,4-Dimethylphenol	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method[4]
60	2,4-Dinitrophenol	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method[4]
61	2,4-Dinitrotoluene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method[4]
62	2,6-Dinitrotoluene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method[4]
63	Di-n-Octyl phthalate	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method[4]
64	Endosulfan	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method[4]
65	Endrin	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method[4]
66	Ethylbenzene	Purge and Trap Gas Chromatographic/ Mass Spectrometric Method[4]
67	Fluoranthene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method[4]
68	Fluorene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method[4]
69	Heptachlor	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method[4]

70 Heptachlor epoxide...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
70	Heptachlor epoxide	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method[4]
71	Hexachlorobenzene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method[4]
72	Hexachloro-1,3-butadiene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method[4]
73	n-Hexane	Purge and Trap Gas Chromatographic/ Mass Spectrometric Method[4]
74	α-HCH	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method[4]
75	β-HCH	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method[4]
76	γ-HCH	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method[4]
77	Hexachlorocyclopentadiene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method[4]
78	Hexachloroethane	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method[4]
79	Indeno(1,2,3-cd)pyrene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method[4]
80	Isophorone	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method[4]
81	Lead	1) Digestion, Direct Air-Acetylene Flame Method[4] 2) Digestion, Electrothermal Atomic Absorption Spectrometric Method[4] 3) Digestion, Inductively Coupled Plasma Spectrometric Method[4]
82	Manganese	1) Digestion, Direct Air-Acetylene Flame Method[4] 2) Digestion, Inductively Coupled Plasma Spectrometric Method [4]

83 Mercury...

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

- PCB-1242...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
	- PCB-1242 - PCB-1248 - PCB-1254 - PCB-1260	
97	Pentachlorophenol	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method[4]
98	pH	Electrometric method[4]
99	Phenanthrene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method[4]
100	Phenol	1) Distillation, Chloroform Extraction Method[4] 2) Distillation, Direct Photometric Method[4]
101	Pyrene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method[4]
102	Selenium	Digestion, Hydride Generation/Atomic Absorption Spectrometric Method[4]
103	Silver	Digestion, Inductively Coupled Plasma Method[4]
104	Styrene	Purge and Trap Gas Chromatographic/ Mass spectrometric Method[4]
105	1,1,2,2-Tetrachloroethane	Purge and Trap Gas Chromatographic/ Mass Spectrometric Method[4]
106	Tetrachloroethylene	Purge and Trap Gas Chromatographic/ Mass Spectrometric Method[4]
107	Toluene	Purge and Trap Gas Chromatographic/ Mass Spectrometric Method[4]
108	Toxaphene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method[4]
109	TPH (C_5-C_8)	Purge and Trap, Gas Chromatographic Method[13,22]
110	TPH ($C_{>8}$-C_{16})	Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic Method[9,22]
111	TPH ($C_{>16}$-C_{35})	Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic Method[9,22]

112 1,2,4-Trichlorobenzene...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
112	1,2,4-Trichlorobenzene	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method[4]
113	1,1,1-Trichloroethane	Purge and Trap Gas Chromatographic/ Mass Spectrometric Method[4]
114	1,1,2-Trichloroethane	Purge and Trap Gas Chromatographic/ Mass Spectrometric Method[4]
115	Trichloroethylene	Purge and Trap Gas Chromatographic/ Mass Spectrometric Method[4]
116	2,4,5-Trichlorophenol	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method[4]
117	2,4,6-Trichlorophenol	Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method[4]
118	1,3,5-Trimethylbenzene	Purge and Trap Gas Chromatographic/ Mass Spectrometric Method[4]
119	Vanadium	Digestion, Inductively Coupled Plasma Spectrometric Method[4]
120	Vinyl acetate	Purge and Trap Gas Chromatographic/ Mass Spectrometric Method[4]
121	Vinyl chloride	Purge and Trap Gas Chromatographic/ Mass Spectrometric Method[4]
122	m-Xylene	Purge and Trap Gas Chromatographic/ Mass Spectrometric Method[4]
123	o-Xylene	Purge and Trap Gas Chromatographic/ Mass Spectrometric Method[4]
124	p-Xylene	Purge and Trap Gas Chromatographic/ Mass Spectrometric Method[4]
125	Xylene (Total)	Purge and Trap Gas Chromatographic/ Mass Spectrometric Method[4]
126	Zinc	1) Digestion, Direct Air-Acetylene Flame Method[4] 2) Digestion, Inductively Coupled Plasma Spectrometric Method[4]

อากาศเสีย...

อากาศเสีย (ปล่องระบาย) จำนวน 28 รายการ

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
1	Antimony	1) Isokinetic Sampling, Digestion, Direct Air-Acetylene Flame Method[5] 2) Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method[5]
2	Arsenic	1) Isokinetic Sampling, Digestion, Hydride Generation/Atomic Absorption Spectrometric Method[5] 2) Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method[5]
3	Beryllium	Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method[5]
4	Cadmium	1) Isokinetic Sampling, Digestion, Direct Air-Acetylene Flame Method[5] 2) Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method[5]
5	Carbon Monoxide	Instrumental Analyzer Method[5]
6	Chlorine	1) Absorption Sampling, Ion Chromatographic Method[5] 2) Isokinetic Sampling, Ion Chromatographic Method[5]
7	Chromium	1) Isokinetic Sampling, Digestion, Direct Air-Acetylene Flame Method[5] 2) Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method[5]
8	Cobalt	1) Isokinetic Sampling, Digestion, Direct Air-Acetylene Flame Method[5] 2) Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method[5]
9	Copper	1) Isokinetic Sampling, Digestion, Direct Air-Acetylene Flame Method[5] 2) Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method[5]

10 Cresol...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
10	Cresol	Adsorption Sampling, Gas Chromatographic Method[5]
11	Dioxins/Furans	Isokinetic Sampling[5]
12	Hydrogen Chloride	1) Absorption Sampling, Ion Chromatographic Method[5] 2) Isokinetic Sampling, Ion Chromatographic Method[5]
13	Hydrogen Fluoride	1) Absorption Sampling, Ion Chromatographic Method[5] 2) Isokinetic Sampling, Ion Chromatographic Method[5]
14	Hydrogen Sulfide	Absorption Sampling, Iodometric Method[5]
15	Lead	1) Isokinetic Sampling, Digestion, Direct Air-Acetylene Flame Method[5] 2) Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method[5]
16	Manganese	1) Isokinetic Sampling, Digestion, Direct Air-Acetylene Flame Method[5] 2) Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method[5]
17	Mercury	Isokinetic Sampling, Digestion, Cold-Vapor Atomic Absorption Spectrometric Method[5]
18	Nickel	1) Isokinetic Sampling, Digestion, Direct Air-Acetylene Flame Method[5] 2) Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method[5]
19	Opacity	Ringelmann's Method[2]
20	Oxides of Nitrogen	1) Absorption Sampling, Phenoldisulfonic acid Method[5] 2) Instrumental Analyzer Method[5]
21	Selenium	Isokinetic Sampling, Digestion, Hydride Generation/Atomic Absorption Spectrometric Method[5]

22 Sulfur Dioxide...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
22	Sulfur Dioxide	1) Absorption Sampling, Barium-Thorin Titrimetric Method[5] 2) Isokinetic Sampling, Barium-Thorin Titrimetric Method[5] 3) Instrumental Analyzer Method[5]
23	Sulfuric acid	Isokinetic Sampling, Barium-Thorin Titrimetric Method[5]
24	Tellurium	Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method[5]
25	Tin	Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method[5]
26	Total Suspended Particulate	Isokinetic Sampling, Gravimetric Method[5]
27	Vanadium	Isokinetic Sampling, Digestion, Inductively Coupled Plasma Method[5]
28	Xylene	1) Adsorption Sampling, Gas Chromatographic Method[5] 2) Adsorption Sampling, Gas Chromatographic/ Mass Spectrometric Method[5]

<u>สิ่งปฏิกูลหรือวัสดุที่ไม่ใช้แล้ว จำนวน 38 รายการ</u>

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
1	Acrylonitrile	1) Waste Extraction, Purge and Trap, Gas Chromatographic/Mass Spectrometric Method[1,13,27] 2) Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method[14,27]
2	Aldrin	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic Method [1,9,23] 2) Soxhlet Extraction, Gas Chromatographic Method[10,23]

3 Antimony...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
3	Antimony	1) Waste Extraction, Digestion, Flame Atomic Absorption Spectrometric Method[1,6,16] 2) Waste Extraction, Digestion, Inductively Coupled Plasma Method [1,6,15] 3) Digestion, Flame Atomic Absorption Spectrometric Method[7,16] 4) Digestion, Inductively Coupled Plasma Method[7,15]
4	Arsenic	1) Waste Extraction, Digestion, Hydride Generation/Atomic Absorption Spectrometric Method[1,6,17] 2) Waste Extraction, Digestion, Inductively Coupled Plasma Method [1,6,15] 3) Digestion, Hydride Generation/Atomic Absorption Spectrometric Method[7,17] 4) Digestion, Inductively Coupled Plasma Method [7,15]
5	Barium	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method [1,6,15] 2) Digestion, Inductively Coupled Plasma Method [7,15]
6	Beryllium	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method [1,6,15] 2) Digestion, Inductively Coupled Plasma Method [7,15]
7	Cadmium	1) Waste Extraction, Digestion, Flame Atomic Absorption Spectrometric Method[1,6,16] 2) Waste Extraction, Digestion, Inductively Coupled Plasma Method [1,6,15] 3) Digestion, Flame Atomic Absorption Spectrometric Method[7,16] 4) Digestion, Inductively Coupled Plasma Method [7,15]

8 Chlordane...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
8	Chlordane	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method [1,9,28] 2) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method [10,28]
9	Chromium	1) Waste Extraction, Digestion, Flame Atomic Absorption Spectrometric Method[1,6,16] 2) Waste Extraction, Digestion, Inductively Coupled Plasma Method [1,6,15] 3) Digestion, Flame Atomic Absorption Spectrometric Method[7,16] 4) Digestion, Inductively Coupled Plasma Method [7,15]
10	Chromium (VI)	1) Waste Extraction, Colorimetric Method [1,18] 2) Alkaline Digestion, Colorimetric Method [8,18]
11	Cobalt	1) Waste Extraction, Digestion, Flame Atomic Absorption Spectrometric Method[1,6,16] 2) Waste Extraction, Digestion, Inductively Coupled Plasma Method [1,6,15] 3) Digestion, Flame Atomic Absorption Spectrometric Method[7,16] 4) Digestion, Inductively Coupled Plasma Method [7,15]
12	Copper	1) Waste Extraction, Digestion, Flame Atomic Absorption Spectrometric Method[1,6,16] 2) Waste Extraction, Digestion, Inductively Coupled Plasma Method [1,6,15] 3) Digestion, Flame Atomic Absorption Spectrometric Method[7,16] 4) Digestion, Inductively Coupled Plasma Method [7,15]

13 2,4-D...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
13	2,4-D	1) Waste Extraction, Gas Chromatographic/ Mass Spectrometric Method [1,26] 2) Ultrasonic Extraction, Gas Chromatographic/ Mass Spectrometric Method [26]
14	DDD	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic Method[1,9,23] 2) Soxhlet Extraction, Gas Chromatographic Method[10,23]
15	DDE	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic Method[1,9,23] 2) Soxhlet Extraction, Gas Chromatographic Method[10,23]
16	DDT	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic Method[1,9,23] 2) Soxhlet Extraction, Gas Chromatographic Method[10,23]
17	Dieldrin	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic Method[1,9,23] 2) Soxhlet Extraction, Gas Chromatographic Method[10,23]
18	Endrin	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic Method[1,9,23] 2) Soxhlet Extraction, Gas Chromatographic Method[10,23]
19	Heptachlor	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic Method[1,9,23]

2) Soxhlet Extraction...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
		2) Soxhlet Extraction, Gas Chromatographic Method[10,23]
20	Kepone	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method[1,9,28] 2) Ultrasonic Extraction, Gas Chromatographic/ Mass Spectrometric Method[11,28]
21	Lead	1) Waste Extraction, Digestion, Flame Atomic Absorption Spectrometric Method[1,6,16] 2) Waste Extraction, Digestion, Inductively Coupled Plasma Method [1,6,15] 3) Digestion, Flame Atomic Absorption Spectrometric Method[7,16] 4) Digestion, Inductively Coupled Plasma Method [7,15]
22	Lindane	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method [1,9,28] 2) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method [10,28]
23	Mercury	1) Waste Extraction, Digestion, Cold-Vapor Atomic Absorption Spectrometric Method[1,19] 2) Digestion, Cold-Vapor Atomic Absorption Spectrometric Method[20]
24	Methoxychlor	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic Method[1,9,23] 2) Soxhlet Extraction, Gas Chromatographic Method[10,23]
25	Mirex	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method[1,9,28] 2) Soxhlet Extraction, Gas Chromatographic Method[10,23]

26 Molybdenum...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
26	Molybdenum	1) Waste Extraction, Digestion, Flame Atomic Absorption Spectrometric Method[1,6,16] 2) Waste Extraction, Digestion, Inductively Coupled Plasma Method [1,6,15] 3) Digestion, Flame Atomic Absorption Spectrometric Method[7,16] 4) Digestion, Inductively Coupled Plasma Method [7,15]
27	Nickel	1) Waste Extraction, Digestion, Flame Atomic Absorption Spectrometric Method[1,6,16] 2) Waste Extraction, Digestion, Inductively Coupled Plasma Method [1,6,15] 3) Digestion, Flame Atomic Absorption Spectrometric Method[7,16] 4) Digestion, Inductively Coupled Plasma Method [7,15]
28	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[1,9,28] 2) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method[10,28]
29	Pentachlorophenol	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method[1,9,28] 2) Soxhlet Extration, Gas Chromatographic/Mass Spectrometric Method[10,28]
30	pH	Electrometric Method[32,33]

31 Selenium...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
31	Selenium	1) Waste Extraction, Digestion, Hydride Generation/Atomic Absorption Spectrometric Method[1,6,21] 2) Waste Extraction, Digestion, Inductively Coupled Plasma Method [1,6,15] 3) Digestion, Hydride Generation/Atomic Absorption Spectrometric Method[7,21] 4) Digestion, Inductively Coupled Plasma Method [7,15]
32	Silver	1) Waste Extraction, Digestion, Flame Atomic Absorption Spectrometric Method[1,6,16] 2) Waste Extraction, Digestion, Inductively Coupled Plasma Method [1,6,15] 3) Digestion, Flame Atomic Absorption Spectrometric Method[7,16] 4) Digestion, Inductively Coupled Plasma Method [7,15]
33	Silvex	1) Waste Extraction, Gas Chromatographic/ Mass Spectrometric Method[1,26] 2) Ultrasonic Extraction, Gas Chromatographic/ Mass Spectrometric Method[26]
34	Thallium	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method [1,6,15] 2) Digestion, Inductively Coupled Plasma Method [7,15]
35	Toxaphene	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic/ Mass Spectrometric Method[1,9,28] 2) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method[10,28]

36 Trichloroethylene...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
36	Trichloroethylene	1) Waste Extraction, Purge and Trap, Gas Chromatographic/Mass Spectrometric Method[1,13,27] 2) Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method[14,27]
37	Vanadium	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method [1,6,15] 2) Digestion, Inductively Coupled Plasma Method [7,15]
38	Zinc	1) Waste Extraction, Digestion, Flame Atomic Absorption Spectrometric Method[1,6,16] 2) Waste Extraction, Digestion, Inductively Coupled Plasma Method [1,6,15] 3) Digestion, Flame Atomic Absorption Spectrometric Method[7,16] 4) Digestion, Inductively Coupled Plasma Method [7,15]

<u>ดิน จำนวน 125 รายการ</u>

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
1	Acenaphthene	Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method[10,28]
2	Acetone	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method[14,27]
3	Aldrin	Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method[10,28]
4	Anthracene	Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method[10,28]
5	Antimony	1) Digestion, Flame Atomic Absorption Spectrometric Method[7,16] 2) Digestion, Inductively Coupled Plasma Method[7,15]

6 Arsenic...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
6	Arsenic	1) Digestion, Hydride Generation/Atomic Absorption Spectrometric Method[7,17] 2) Digestion, Inductively Coupled Plasma Method[7,15]
7	Atrazine	Soxhlet Extraction, Gas Chromatographic Method [10,25]
8	Barium	Digestion, Inductively Coupled Plasma Method[7,15]
9	Benz(a)anthracene	Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method[10,28]
10	Benzene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method[14,27]
11	Benzo(b)fluoranthene	Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method[10,28]
12	Benzo(k)fluoranthene	Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method[10,28]
13	Benzoic acid	Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method[10,28]
14	Benzo(a)pyrene	Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method[10,28]
15	Benzo(g,h,i)perylene	Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method[10,28]
16	Beryllium	Digestion, Inductively Coupled Plasma Method[7,15]
17	Bis(2-chloroethyl)ether	Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method[10,28]
18	Bis(2-ethylhexyl)phthalate	Soxhlet Extraction, Gas Chromatographic Method[10,24]
19	Bromodichloromethane	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method[14,27]
20	Bromoform	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method[14,27]

21 Butanol...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
21	Butanol	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method[14,27]
22	Butyl benzyl phthalate	Soxhlet Extraction, Gas Chromatographic Method[10,26]
23	Cadmium	1) Digestion, Flame Atomic Absorption Spectrometric Method[7,16] 2) Digestion, Inductively Coupled Plasma Method[7,15]
24	Carbazole	Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method[10,28]
25	Carbon disulfide	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method[14,27]
26	Carbon tetrachloride	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method[14,27]
27	Chlordane	Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method[10,28]
28	p-Chloroaniline	Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method[10,28]
29	Chlorobenzene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method[14,27]
30	Chlorodibromomethane	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method[14,27]
31	Chloroform	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method[14,27]
32	2-Chlorophenol	Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method[10,28]
33	Chromium	1) Digestion, Flame Atomic Absorption Spectrometric Method[7,16] 2) Digestion, Inductively Coupled Plasma Method[7,15]
34	Chromium (III)	Digestion, Inductively Coupled Plasma Method; Alkaline Digestion Colorimetric Method; Calculation[7,8,15,18]

35 Chromium (VI)...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
35	Chromium (VI)	Alkaline Digestion, Colorimetric Method[8,18]
36	Chrysene	Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method[10,28]
37	Cyanide	Extraction, Distillation, Colorimetric Method[29,30,31]
38	2,4-D	Ultrasonic Extraction, Gas Chromatographic/Mass Spectrometric Method[26]
39	DDD	Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method[10,28]
40	DDE	Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method[10,28]
41	DDT	Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method[10,28]
42	Dibenz(a,h)anthracene	Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method[10,28]
43	Di-n-butyl phthalate	Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method[10,28]
44	1,2-Dichlorobenzene	Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method[10,28]
45	1,3-Dichlorobenzene	Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method[10,28]
46	1,4-Dichlorobenzene	Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method[10,28]
47	3,3′-Dichlorobenzidine	Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method[10,28]
48	1,1-Dichloroethane	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method[14,27]
49	1,2-Dichloroethane	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method[14,27]
50	1,1-Dichloroethylene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method[14,27]

52 trans-1,2-Dichloroethylene...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
52	trans-1,2-Dichloroethylene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method[14,27]
53	2,4-Dichlorophenol	Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method[10,28]
54	1,2-Dichloropropane	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method[14,27]
55	1,3-Dichloropropane	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method[14,27]
56	1,3-Dichloropropene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method[14,27]
57	Dieldrin	Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method[10,28]
58	Diethyl phthalate	Soxhlet Extraction, Gas Chromatographic Method[10,24]
59	2,4-Dimethylphenol	Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method[10,28]
60	2,4-Dinitrophenol	Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method[10,28]
61	2,4-Dinitrotoluene	Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method[10,28]
62	2,6-Dinitrotoluene	Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method[10,28]
63	Di-n-Octyl phthalate	Soxhlet Extraction, Gas Chromatographic Method[10,24]
64	Endosulfan	Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method[10,28]
65	Endrin	Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method[10,28]
66	Ethylbenzene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method[14,27]
67	Fluoranthene	Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method[10,28]

68 Fluorene...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
68	Fluorene	Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method[10,28]
69	Heptachlor	Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method[10,28]
70	Heptachlor epoxide	Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method[10,28]
71	Hexachlorobenzene	Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method[10,28]
72	Hexachloro-1,3-butadiene	Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method[10,28]
73	n-Hexane	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method[14,27]
74	α-HCH	Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method[10,28]
75	β-HCH	Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method[10,28]
76	γ-HCH	Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method[10,28]
77	Hexachlorocyclopentadiene	Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method[10,28]
78	Hexachloroethane	Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method[10,28]
79	Indeno(1,2,3-cd)pyrene	Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method[10,28]
80	Isophorone	Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method[10,28]
81	Lead	1) Digestion, Flame Atomic Absorption Spectrometric Method[7,16] 2) Digestion, Inductively Coupled Plasma Method[7,15]

82 Manganese...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
82	Manganese	1) Digestion, Flame Atomic Absorption Spectrometric Method[7,16] 2) Digestion, Inductively Coupled Plasma Method[7,15]
83	Mercury	Digestion, Cold-Vapor Atomic Absorption Spectrometric Method[20]
84	Methanol	Equilibrium Headspace, Gas chromatographic Method [12,22]
85	Methoxychlor	Soxhlet Extraction, Gas Chromatographic Method[10,23]
86	Methyl bromide	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method[14,27]
87	Methylene chloride	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method[14,27]
88	2-Methylphenol	Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method[10,28]
89	2-Methylnaphthalene	Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method[10,28]
90	Methyl tert-butyl ether	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method[14,27]
91	Naphthalene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method[14,27]
92	Nickel	1) Digestion, Flame Atomic Absorption Spectrometric Method[7,16] 2) Digestion, Inductively Coupled Plasma Method[7,15]
93	Nitrobenzene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method[14,27]
94	N-Nitrosodiphenylamine	Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method[10,28]
95	N-Nitrosodi-n-propylamine	Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method[10,28]

96 Polychlorinated...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
96	Polychlorinated Biphenyls - Aroclor 1016 - Aroclor 1221 - Aroclor 1232 - Aroclor 1242 - Aroclor 1248 - Aroclor 1254 - Aroclor 1260	Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method[10,28]
97	Pentachlorophenol	Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method[10,28]
98	Phenanthrene	Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method[10,28]
99	Phenol	Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method[10,28]
100	Pyrene	Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method[10,28]
101	Selenium	Digestion, Hydride Generation/Atomic Absorption Spectrometric Method[7,21]
102	Silver	Digestion, Inductively Coupled Plasma Method[7,15]
103	Styrene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method[14,27]
104	1,1,2,2-Tetrachloroethane	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method[14,27]
105	Tetrachloroethylene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method[14,27]
106	Toluene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method[14,27]
107	Toxaphene	Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method[10,28]
108	TPH (C_5-C_8)	Purge and Trap, Gas Chromatographic Method[14,22]

109 TPH ($C_{>8}$-C_{16})...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
109	TPH ($C_{>8}$-C_{16})	Soxhlet Extraction, Gas Chromatographic Method[10,22]
110	TPH ($C_{>16}$-C_{35})	Soxhlet Extraction, Gas Chromatographic Method[10,22]
111	1,2,4-Trichlorobenzene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method[14,27]
112	1,1,1-Trichloroethane	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method[14,27]
113	1,1,2-Trichloroethane	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method[14,27]
114	Trichloroethylene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method[14,27]
115	2,4,5-Trichlorophenol	Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method[10,28]
116	2,4,6-Trichlorophenol	Soxhlet Extraction, Gas Chromatographic/Mass Spectrometric Method[10,28]
117	1,3,5-Trimethylbenzene	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method[14,27]
118	Vanadium	Digestion, Inductively Coupled Plasma Method[7,15]
119	Vinyl acetate	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method[14,27]
120	Vinyl chloride	Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method[14,27]
121	m-Xylene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method[14,27]
122	o-Xylene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method[14,27]
123	p-Xylene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method[14,27]
124	Xylene (Total)	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method[14,27]

125 Zinc...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
125	Zinc	1) Digestion, Flame Atomic Absorption Spectrometric Method[7,16] 2) Digestion, Inductively Coupled Plasma Method[7,15]

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ที่ อก ๐๓๑๐(๑)/๑๑๑

กรมโรงงานอุตสาหกรรม
ถนนพระรามที่ ๖ แขวงทุ่งพญาไท
เขตราชเทวี กรุงเทพฯ ๑๐๔๐๐

๒๔ มกราคม ๒๕๖๗

เรื่อง เปลี่ยนแปลงบุคลากรและเอกสารอ้างอิงวิธีวิเคราะห์สารมลพิษ

เรียน กรรมการผู้จัดการ บริษัท เอส.พี.เอส คอนซัลติ้ง เซอร์วิส จำกัด

อ้างถึง คำขอขึ้นทะเบียน/ต่ออายุ/เปลี่ยนแปลงบุคลากร และขนิดสารมลพิษของห้องปฏิบัติการวิเคราะห์เอกชน ลงวันที่ ๒๖ ธันวาคม ๒๕๖๖

สิ่งที่ส่งมาด้วย เอกสารแนบท้ายหนังสือเปลี่ยนแปลงบุคลากรและเอกสารอ้างอิงวิธีวิเคราะห์สารมลพิษ บริษัท เอส.พี.เอส คอนซัลติ้ง เซอร์วิส จำกัด จำนวน ๘ แผ่น

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

กรมโรงงานอุตสาหกรรมพิจารณาแล้ว มีความเห็นให้เปลี่ยนแปลงดังนี้

[redacted]

๔. ให้ยกเลิกขอบข่ายรายการสารมลพิษในสิ่งปฏิกูลหรือวัสดุที่ไม่ใช้แล้ว ตามรายการเอกสารแนบท้ายหนังสือต่ออายุรับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน ที่ อก ๐๓๑๐(๑)/๑๔๓๒๑ ลงวันที่ ๑๑ ตุลาคม ๒๕๖๖

๕. ให้วิเคราะห์สารมลพิษตามขอบข่ายที่ได้รับขึ้นทะเบียนให้วิเคราะห์ในสิ่งปฏิกูลหรือวัสดุที่ไม่ใช้แล้ว จำนวน ๓๘ รายการ ตามเอกสารแนบท้ายหนังสือเปลี่ยนแปลงบุคลากรและเอกสารอ้างอิงวิธีวิเคราะห์สารมลพิษ ดังสิ่งที่ส่งมาด้วย

อนึ่ง...

อนึ่ง หนังสือฉบับนี้จะหมดอายุพร้อมหนังสือต่ออายุรับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน คือในวันที่ ๑๐ กรกฎาคม ๒๕๖๙ ทั้งนี้ สามารถยื่นคำขอผ่านระบบอิเล็กทรอนิกส์ได้ที่หน้าเว็บไซต์กรมโรงงานอุตสาหกรรม

จึงเรียนมาเพื่อทราบ

ขอแสดงความนับถือ

(นายศิระ จันทร์เฉิด)
นักวิทยาศาสตร์เชี่ยวชาญ รักษาราชการแทน
ผู้อำนวยการกองวิจัยและเตือนภัยมลพิษโรงงาน
ปฏิบัติราชการแทนอธิบดีกรมโรงงานอุตสาหกรรม

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

เอกสารแนบท้ายหนังสือเปลี่ยนแปลงบุคลากรและเอกสารอ้างอิงวิธีวิเคราะห์สารมลพิษ
บริษัท เอส.พี.เอส. คอนซัลติ้ง เซอร์วิส จำกัด เลขทะเบียน ว-๐๑๑
ที่ อก ๐๓๑๐(๑)/ ๖๖๖ ลงวันที่ ๒๔ มกราคม ๒๕๖๗

ขอบข่ายสารมลพิษที่ได้รับขึ้นทะเบียนจากกรมโรงงานอุตสาหกรรม จำนวน ๓๘ รายการ

สิ่งปฏิกูลหรือวัสดุที่ไม่ใช้แล้ว 38 รายการ

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
1	Acrylonitrile	1) Waste Extraction, Purge and Trap, Gas Chromatographic/Mass Spectrometric Method[1,9,23] 2) Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method[10,23]
2	Aldrin	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic Method[1,5,19] 2) Soxhlet Extraction, Gas Chromatographic Method[6,19]
3	Antimony	1) Waste Extraction, Digestion, Flame Atomic Absorption Spectrometric Method[1,2,12] 2) Waste Extraction, Digestion, Inductively Coupled Plasma Method [1,2,11] 3) Digestion, Flame Atomic Absorption Spectrometric Method[3,12] 4) Digestion, Inductively Coupled Plasma Method[3,11]
4	Arsenic	1) Waste Extraction, Digestion, Hydride Generation/ Atomic Absorption Spectrometric Method[1,2,13] 2) Waste Extraction, Digestion, Inductively Coupled Plasma Method [1,2,11] 3) Digestion, Hydride Generation/ Atomic Absorption Spectrometric Method[3,13] 4) Digestion, Inductively Coupled Plasma Method [3,11]
5	Barium	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method [1,2,11] 2) Digestion, Inductively Coupled Plasma Method [3,11]
6	Beryllium	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method [1,2,11] 2) Digestion, Inductively Coupled Plasma Method [3,11]
7	Cadmium	1) Waste Extraction, Digestion, Flame Atomic Absorption Spectrometric Method[1,2,12] 2) Waste Extraction, Digestion, Inductively Coupled Plasma Method [1,2,11] 3) Digestion, Flame Atomic Absorption Spectrometric Method[3,12] 4) Digestion, Inductively Coupled Plasma Method [3,11]

8 Chlordane...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
8	Chlordane	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method [1,5,24] 2) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method [6,24]
9	Chromium	1) Waste Extraction, Digestion, Flame Atomic Absorption Spectrometric Method[1,2,12] 2) Waste Extraction, Digestion, Inductively Coupled Plasma Method [1,2,11] 3) Digestion, Flame Atomic Absorption Spectrometric Method[3,12] 4) Digestion, Inductively Coupled Plasma Method [3,11]
10	Chromium (VI)	1) Waste Extraction, Colorimetric Method [1,14] 2) Alkaline Digestion, Colorimetric Method [4,14]
11	Cobalt	1) Waste Extraction, Digestion, Flame Atomic Absorption Spectrometric Method[1,2,12] 2) Waste Extraction, Digestion, Inductively Coupled Plasma Method [1,2,11] 3) Digestion, Flame Atomic Absorption Spectrometric Method[3,12] 4) Digestion, Inductively Coupled Plasma Method [3,11]
12	Copper	1) Waste Extraction, Digestion, Flame Atomic Absorption Spectrometric Method[1,2,12] 2) Waste Extraction, Digestion, Inductively Coupled Plasma Method [1,2,11] 3) Digestion, Flame Atomic Absorption Spectrometric Method[3,12] 4) Digestion, Inductively Coupled Plasma Method [3,11]
13	2,4-D	1) Waste Extraction, Gas Chromatographic/ Mass Spectrometric Method [1,22] 2) Ultrasonic Extraction, Gas Chromatographic/ Mass Spectrometric Method [22]
14	DDD	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic Method[1,5,19] 2) Soxhlet Extraction, Gas Chromatographic Method[6,19]

15 DDE...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
15	DDE	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic Method[1,5,19] 2) Soxhlet Extraction, Gas Chromatographic Method[6,19]
16	DDT	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic Method[1,5,19] 2) Soxhlet Extraction, Gas Chromatographic Method[6,19]
17	Dieldrin	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic Method[1,5,19] 2) Soxhlet Extraction, Gas Chromatographic Method[6,19]
18	Endrin	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic Method[1,5,19] 2) Soxhlet Extraction, Gas Chromatographic Method[6,19]
19	Heptachlor	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic Method[1,5,19] 2) Soxhlet Extraction, Gas Chromatographic Method[6,19]
20	Kepone	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method[1,5,24] 2) Ultrasonic Extraction, Gas Chromatographic/ Mass Spectrometric Method[7,24]
21	Lead	1) Waste Extraction, Digestion, Flame Atomic Absorption Spectrometric Method[1,2,12] 2) Waste Extraction, Digestion, Inductively Coupled Plasma Method [1,2,11] 3) Digestion, Flame Atomic Absorption Spectrometric Method[3,12] 4) Digestion, Inductively Coupled Plasma Method [3,11]
22	Lindane	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method [1,5,24] 2) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method [6,24]
23	Mercury	1) Waste Extraction, Digestion, Cold-Vapor Atomic Absorption Spectrometric Method[1,15] 2) Digestion, Cold-Vapor Atomic Absorption Spectrometric Method[16]
24	Methoxychlor	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic Method[1,5,19] 2) Soxhlet Extraction, Gas Chromatographic Method[6,19]

25 Mirex...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
25	Mirex	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method[1,5,24] 2) Soxhlet Extraction, Gas Chromatographic Method[6,19]
26	Molybdenum	1) Waste Extraction, Digestion, Flame Atomic Absorption Spectrometric Method[1,2,12] 2) Waste Extraction, Digestion, Inductively Coupled Plasma Method [1,2,11] 3) Digestion, Flame Atomic Absorption Spectrometric Method[3,12] 4) Digestion, Inductively Coupled Plasma Method [3,11]
27	Nickel	1) Waste Extraction, Digestion, Flame Atomic Absorption Spectrometric Method[1,2,12] 2) Waste Extraction, Digestion, Inductively Coupled Plasma Method [1,2,11] 3) Digestion, Flame Atomic Absorption Spectrometric Method[3,12] 4) Digestion, Inductively Coupled Plasma Method [3,11]
28	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[1,5,24] 2) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method[6,24]
29	Pentachlorophenol	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method[1,5,24] 2) Soxhlet Extration, Gas Chromatographic/ Mass Spectrometric Method[6,24]
30	pH	Electrometric Method[28,29]

31 Selenium...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
31	Selenium	1) Waste Extraction, Digestion, Hydride Generation/Atomic Absorption Spectrometric Method[1,2,17] 2) Waste Extraction, Digestion, Inductively Coupled Plasma Method[1,2,11] 3) Digestion, Hydride Generation/Atomic Absorption Spectrometric Method[3,17] 4) Digestion, Inductively Coupled Plasma Method[3,11]
32	Silver	1) Waste Extraction, Digestion, Flame Atomic Absorption Spectrometric Method[1,2,12] 2) Waste Extraction, Digestion, Inductively Coupled Plasma Method[1,2,11] 3) Digestion, Flame Atomic Absorption Spectrometric Method[3,12] 4) Digestion, Inductively Coupled Plasma Method[3,11]
33	Silvex	1) Waste Extraction, Gas Chromatographic/ Mass Spectrometric Method[1,22] 2) Ultrasonic Extraction, Gas Chromatographic/ Mass Spectrometric Method[22]
34	Thallium	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method[1,2,11] 2) Digestion, Inductively Coupled Plasma Method[3,11]
35	Toxaphene	1) Waste Extraction, Separatory Funnel Liquid-Liquid Extraction, Gas Chromatographic/Mass Spectrometric Method[1,5,24] 2) Soxhlet Extraction, Gas Chromatographic/ Mass Spectrometric Method[6,24]
36	Trichloroethylene	1) Waste Extraction, Purge and Trap, Gas Chromatographic/Mass Spectrometric Method[1,9,23] 2) Purge and Trap, Gas Chromatographic/ Mass Spectrometric Method[10,23]
37	Vanadium	1) Waste Extraction, Digestion, Inductively Coupled Plasma Method[1,2,11] 2) Digestion, Inductively Coupled Plasma Method[3,11]

38 Zinc...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
38	Zinc	1) Waste Extraction, Digestion, Flame Atomic Absorption Spectrometric Method[1,2,12] 2) Waste Extraction, Digestion, Inductively Coupled Plasma Method[1,2,11] 3) Digestion, Flame Atomic Absorption Spectrometric Method[3,12] 4) Digestion, Inductively Coupled Plasma Method[3,11]

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ที่ อก ๐๓๑๐(๑)/ ๒๐๗๒

กรมโรงงานอุตสาหกรรม
ถนนพระรามที่ ๖ แขวงทุ่งพญาไท
เขตราชเทวี กรุงเทพฯ ๑๐๔๐๐

๐๕ มีนาคม ๒๕๖๗

เรื่อง เปลี่ยนแปลงบุคลากรและสารมลพิษที่วิเคราะห์

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

อ้างถึง คำขอขึ้นทะเบียน/ต่ออายุ/เปลี่ยนแปลงบุคลากร และชนิดสารมลพิษของห้องปฏิบัติการวิเคราะห์เอกชน ลงวันที่ ๘ กุมภาพันธ์ ๒๕๖๗

สิ่งที่ส่งมาด้วย เอกสารแนบท้ายหนังสือเปลี่ยนแปลงบุคลากรและสารมลพิษที่วิเคราะห์ บริษัท เอส.พี.เอส. คอนซัลติ้ง เซอร์วิส จำกัด จำนวน ๑ แผ่น

ตามหนังสืออ้างถึง บริษัท เอส.พี.เอส. คอนซัลติ้ง เซอร์วิส จำกัด ห้องปฏิบัติการวิเคราะห์เอกชน เลขทะเบียน ว-๐๑๑ สถานที่ตั้งเลขที่ ๗ ซอยพหลโยธิน ๒๔ ถนนพหลโยธิน แขวงจอมพล เขตจตุจักร กรุงเทพมหานคร ขอเปลี่ยนแปลงบุคลากรและสารมลพิษที่วิเคราะห์ ความละเอียดแจ้งแล้ว นั้น

กรมโรงงานอุตสาหกรรมพิจารณาแล้วมีความเห็นดังนี้

[redacted]

๓. ให้เพิ่มขอบข่ายสารมลพิษที่วิเคราะห์ในดิน ตามสิ่งที่ส่งมาด้วย

อนึ่ง หนังสือฉบับนี้จะหมดอายุพร้อมหนังสือต่ออายุรับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน คือในวันที่ ๑๐ กรกฎาคม ๒๕๖๙ ทั้งนี้ สามารถยื่นคำขอผ่านระบบอิเล็กทรอนิกส์ได้ที่หน้าเว็บไซต์กรมโรงงานอุตสาหกรรม

จึงเรียนมาเพื่อทราบ

ขอแสดงความนับถือ

(นายพรยศ กลั่นกรอง)
รองอธิบดี ปฏิบัติราชการแทน
อธิบดีกรมโรงงานอุตสาหกรรม

กองวิจัยและเตือนภัยมลพิษโรงงาน
กลุ่มมาตรฐานวิธีการวิเคราะห์ทดสอบมลพิษและทะเบียนห้องปฏิบัติการ
โทร. ๐ ๒๔๓๐ ๖๓๑๒ ต่อ ๒๑๐๓-๕
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Green Industry
"อุตสาหกรรมก้าวไกล ประเทศไทยก้าวหน้า ร่วมกันพัฒนา อุตสาหกรรมสีเขียว"

ขอบข่ายสารมลพิษที่ได้รับขึ้นทะเบียนจากกรมโรงงานอุตสาหกรรม จำนวน ๑ รายการ

ดิน จำนวน 1 รายการ

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
1	cis-1,2-Dichloroethylene	Purge and Trap, Gas Chromatographic/Mass Spectrometric Method

เอกสารอ้างอิง

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ที่ อก ๐๓๑๐(๑)/ ๓๘๕๖

กรมโรงงานอุตสาหกรรม
ถนนพระรามที่ ๖ แขวงทุ่งพญาไท
เขตราชเทวี กรุงเทพฯ ๑๐๔๐๐

๑๘ เมษายน ๒๕๖๗

เรื่อง เปลี่ยนแปลงบุคลากรของห้องปฏิบัติการวิเคราะห์

เรียน กรรมการผู้จัดการ บริษัท เอส.พี.เอส คอนซัลติ้ง เซอร์วิส จำกัด

อ้างถึง คำขอขึ้นทะเบียน/ต่ออายุ/เปลี่ยนแปลงบุคลากร และชนิดสารมลพิษของห้องปฏิบัติการวิเคราะห์เอกชน ลงวันที่ ๑๙ มีนาคม ๒๕๖๗

ตามคำขอที่อ้างถึง บริษัท เอส.พี.เอส คอนซัลติ้ง เซอร์วิส จำกัด ห้องปฏิบัติการวิเคราะห์เอกชน เลขทะเบียน ว-๐๑๑ สถานที่ตั้งเลขที่ ๗ ซอยพหลโยธิน ๒๔ ถนนพหลโยธิน แขวงจอมพล เขตจตุจักร กรุงเทพมหานคร ขอเปลี่ยนแปลงบุคลากร ความละเอียดแจ้งแล้ว นั้น

กรมโรงงานอุตสาหกรรมพิจารณาแล้ว ให้ยกเลิกเจ้าหน้าที่ประจำห้องปฏิบัติการวิเคราะห์ จำนวน ๒ ราย ได้แก่

[redacted]

จึงเรียนมาเพื่อทราบ

ขอแสดงความนับถือ

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เขตราชเทวี กรุงเทพฯ ๑๐๔๐๐

๑๔ พฤษภาคม ๒๕๖๗

เรื่อง เปลี่ยนแปลงบุคลากรของห้องปฏิบัติการวิเคราะห์

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

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จึงเรียนมาเพื่อทราบ

ขอแสดงความนับถือ

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กรมโรงงานอุตสาหกรรม
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เขตราชเทวี กรุงเทพฯ ๑๐๔๐๐

๒๖ สิงหาคม ๒๕๖๗

เรื่อง เปลี่ยนแปลงบุคลากรของห้องปฏิบัติการวิเคราะห์

เรียน กรรมการผู้จัดการ บริษัท เอส.พี.เอส คอนซัลติ้ง เซอร์วิส จำกัด

อ้างถึง คำขอขึ้นทะเบียน/ต่ออายุ/เปลี่ยนแปลงบุคลากร และชนิดสารมลพิษของห้องปฏิบัติการวิเคราะห์เอกชน ลงวันที่ ๑ สิงหาคม ๒๕๖๗

ตามคำขอที่อ้างถึง บริษัท เอส.พี.เอส คอนซัลติ้ง เซอร์วิส จำกัด ห้องปฏิบัติการวิเคราะห์เอกชน เลขทะเบียน ว-๐๑๑ สถานที่ตั้งเลขที่ ๗ ซอยพหลโยธิน ๒๔ ถนนพหลโยธิน แขวงจอมพล เขตจตุจักร กรุงเทพมหานคร ขอเปลี่ยนแปลงบุคลากร ความละเอียดแจ้งแล้ว นั้น

กรมโรงงานอุตสาหกรรมพิจารณาแล้ว มีความเห็นดังนี้

[redacted]

อนึ่ง หนังสือฉบับนี้จะหมดอายุพร้อมหนังสือต่ออายุรับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน ในวันที่ ๑๐ กรกฎาคม ๒๕๖๙

จึงเรียนมาเพื่อทราบ

ขอแสดงความนับถือ

(นายพรยศ กลั่นกรอง)
รองอธิบดี ปฏิบัติราชการแทน
อธิบดีกรมโรงงานอุตสาหกรรม

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

ที่ อก ๐๓๑๐(๑)/ ๒๖๗๖

กรมโรงงานอุตสาหกรรม
ถนนพระรามที่ ๖ แขวงทุ่งพญาไท
เขตราชเทวี กรุงเทพฯ ๑๐๔๐๐

๒๕ มีนาคม ๒๕๖๘

เรื่อง เปลี่ยนแปลงบุคลากรของห้องปฏิบัติการวิเคราะห์

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

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ตามคำขอที่อ้างถึง บริษัท เอส.พี.เอส. คอนซัลติ้ง เซอร์วิส จำกัด ห้องปฏิบัติการวิเคราะห์เอกชน เลขทะเบียน ว-๐๑๑ สถานที่ตั้งเลขที่ ๗ ซอยพหลโยธิน ๒๔ ถนนพหลโยธิน แขวงจอมพล เขตจตุจักร กรุงเทพมหานคร ขอเปลี่ยนแปลงบุคลากร ความละเอียดแจ้งแล้ว นั้น

กรมโรงงานอุตสาหกรรมพิจารณาแล้ว มีความเห็นดังนี้

[redacted]

อนึ่ง หนังสือฉบับนี้จะสิ้นอายุพร้อมหนังสือต่ออายุรับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน ในวันที่ ๑๐ กรกฎาคม ๒๕๖๙

จึงเรียนมาเพื่อทราบ

ขอแสดงความนับถือ

(นายธีรทัศน์ อิศรางกูร ณ อยุธยา)
รองอธิบดี ปฏิบัติราชการแทน
อธิบดีกรมโรงงานอุตสาหกรรม

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

Green Industry
"อุตสาหกรรมก้าวไกล ประเทศไทยก้าวหน้า ร่วมกันพัฒนา อุตสาหกรรมสีเขียว"

ภาคผนวกที่ 3

ใบอนุญาตเป็นผู้ให้บริการตรวจวัด
ระดับความเข้มข้นของสารเคมีอันตรายในบรรยากาศ
ของสถานที่ทำงาน และสถานที่เก็บรักษาสารเคมีอันตราย
ใบอนุญาตเป็นผู้ให้บริการวิเคราะห์
ระดับความเข้มข้นของสารเคมีอันตรายในบรรยากาศ
ของสถานที่ทำงาน และสถานที่เก็บรักษาสารเคมีอันตราย

แบบ กภ.บญ
นิติบุคคล

กรมสวัสดิการและคุ้มครองแรงงาน
ใบอนุญาต
เป็นนิติบุคคลผู้ให้บริการตรวจวัดระดับความเข้มข้นของสารเคมีอันตราย
ในบรรยากาศของสถานที่ทำงานและสถานที่เก็บรักษาสารเคมีอันตราย

ใบอนุญาตเลขที่ ๐๒๐๑-๐๓-๒๕๖๔-๐๐๐๑

อนุญาตให้ บริษัท เอส.พี.เอส. คอนซัลติ้ง เซอร์วิส จำกัด
เลขทะเบียนนิติบุคคล ๐๑๐๕๕๒๔๐๐๗๓๒๔
ตั้งอยู่ เลขที่ ๗ ซอยพหลโยธิน ๒๔ ถนนพหลโยธิน แขวงจอมพล เขตจตุจักร กรุงเทพมหานคร
เป็นนิติบุคคลผู้ให้บริการด้านความปลอดภัย อาชีวอนามัย และสภาพแวดล้อมในการทำงาน ตามกฎกระทรวงกำหนดมาตรฐานในการบริหาร จัดการ และดำเนินการด้านความปลอดภัย อาชีวอนามัย และสภาพแวดล้อมในการทำงานเกี่ยวกับสารเคมีอันตราย พ.ศ. ๒๕๕๖ ในการเป็นผู้ให้บริการตรวจวัดระดับความเข้มข้นของสารเคมีอันตรายในบรรยากาศของสถานที่ทำงานและสถานที่เก็บรักษาสารเคมีอันตราย ประกอบกับกฎกระทรวงการขึ้นทะเบียนและการอนุญาตให้บริการเพื่อส่งเสริมความปลอดภัย อาชีวอนามัย และสภาพแวดล้อมในการทำงาน พ.ศ. ๒๕๖๔ แห่งพระราชบัญญัติความปลอดภัย อาชีวอนามัย และสภาพแวดล้อมในการทำงาน พ.ศ. ๒๕๕๔ โดยมีบุคลากร จำนวน ๕๕ ราย และรายการเครื่องมือตรวจวัด จำนวน ๑๔๐ เครื่อง ดังรายละเอียดแนบท้ายใบอนุญาตนี้

ทั้งนี้ ตั้งแต่วันที่ ๑๔ ธันวาคม พ.ศ. ๒๕๖๗ ถึงวันที่ ๑๓ ธันวาคม พ.ศ. ๒๕๗๐

ให้ไว้ ณ วันที่ ๑๒ ธันวาคม พ.ศ. ๒๕๖๗

(นายศักดิ์ศิลป์ ตุลาธร)
ผู้ตรวจราชการกรม ปฏิบัติราชการแทน
อธิบดีกรมสวัสดิการและคุ้มครองแรงงาน

รายการเครื่องมือตรวจวัดแนบท้ายใบอนุญาต
เป็นนิติบุคคลผู้ให้บริการตรวจวัดระดับความเข้มข้นของสารเคมีอันตรายในบรรยากาศของสถานที่ทำงาน
และสถานที่เก็บรักษาสารเคมีอันตราย
ของบริษัท เอส.พี.เอส. คอนซัลติ้ง เซอร์วิส จำกัด
ใบอนุญาตเลขที่ ๐๒๐๑-๐๓-๒๕๖๔-๐๐๐๑

ลำดับที่	รายการเครื่องมือ	รายละเอียด		จำนวน (เครื่อง)
๑	เครื่องมือเก็บตัวอย่างอากาศ (Personal Air Sampling Pump)	ยี่ห้อ	SKC	๒๖
		รุ่น	224-PCXR3	
		Serial No.	500363	
			503480	
			503915	
			504324	
			504569	
			505673	
			508302	
			508366	
			508367	
			509811	
			509845	
			509852	
			509860	
			509861	
			509862	
			510623	
			510677	
			510785	
			510798	
			510920	
			511432	
			511450	
			512606	

ลำดับที่	รายการเครื่องมือ	รายละเอียด		จำนวน (เครื่อง)
๑	เครื่องมือเก็บตัวอย่างอากาศ (Personal Air Sampling Pump) (ต่อ)	Serial No.	691587	
			798393	
			798479	
		ยี่ห้อ	SKC	๘๓
		รุ่น	224-PCXR4	
		Serial No.	034637	
			034656	
			091567	
			091568	
			091638	
			091756	
			091950	
			093186	
			093811	
			262101	
			262188	
			500400	
			505872	
			505977	
			505993	
			506295	
			508301	
			508307	
			508333	
			508375	
			509820	
			509821	
			510710	
			510919	
			512625	
			512655	

ลำดับที่	รายการเครื่องมือ	รายละเอียด		จำนวน (เครื่อง)
๑	เครื่องมือเก็บตัวอย่างอากาศ (Personal Air Sampling Pump) (ต่อ)	Serial No.	529089	
			529341	
			529594	
			529643	
			564315	
			566743	
			566747	
			566753	
			566780	
			602073	
			602467	
			602682	
			602753	
			602804	
			612669	
			612693	
			612753	
			612962	
			612968	
			626041	
			626100	
			626137	
			626140	
			626164	
			626166	
			626167	
			626254	
			626256	
			626262	
			626313	
			626363	

ลำดับที่	รายการเครื่องมือ	รายละเอียด		จำนวน (เครื่อง)
๑	เครื่องมือเก็บตัวอย่างอากาศ (Personal Air Sampling Pump) (ต่อ)	Serial No.	626463 626472 626474 626477 626479 626860 671950 691484 691489 691509 691531 691570 691599 691654 691672 691673 707398 707402 761095 798349 798456 798470 798480 798489 883215 034636	
		ยี่ห้อ รุ่น Serial No.	SKC 224-PCXR8 034650 510987 529457	๒๙

ลำดับที่	รายการเครื่องมือ	รายละเอียด		จำนวน (เครื่อง)
๑	เครื่องมือเก็บตัวอย่างอากาศ (Personal Air Sampling Pump) (ต่อ)	Serial No.	529645 566756 566802 626129 626131 626450 665728 691592 707349 707432 707444 707446 707460 707481 707670 707893 707956 761052 761067 508310 091763 091764 091765 093183 505757 505975	
๒	เครื่องมือและอุปกรณ์สำหรับปรับความถูกต้อง (Pump calibrator)	ยี่ห้อ รุ่น Serial No.	MesaLabs Defender 510-H 136164	๑

ลำดับที่	รายการเครื่องมือ	รายละเอียด		จำนวน (เครื่อง)
๒	เครื่องมือและอุปกรณ์สำหรับปรับความถูกต้อง (Pump calibrator) (ต่อ)	ยี่ห้อ รุ่น Serial No.	MesaLabs Defender 510-M 136833	๑

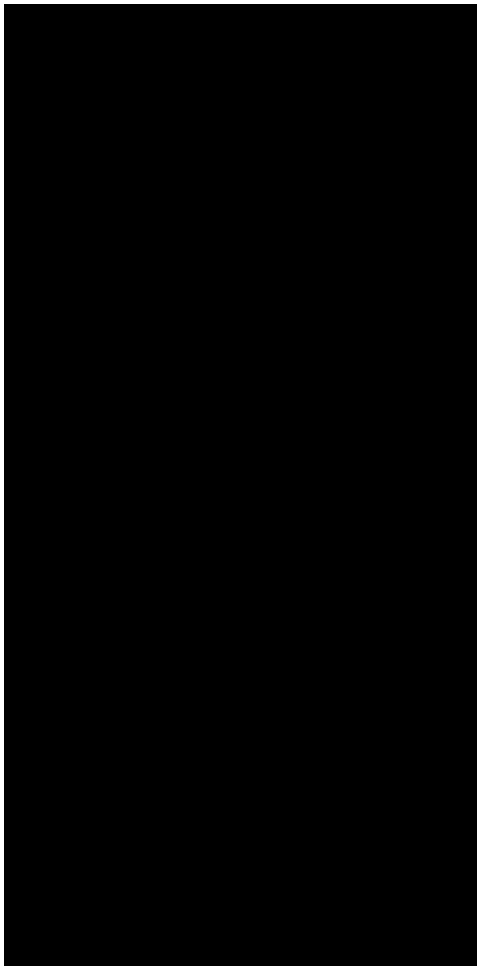
ทั้งนี้ ตั้งแต่วันที่ ๑๔ ธันวาคม พ.ศ. ๒๕๖๗ ถึงวันที่ ๑๓ ธันวาคม พ.ศ. ๒๕๗๐

ให้ไว้ ณ วันที่ ๑๒ ธันวาคม พ.ศ. ๒๕๖๗

(นายศักดิ์ศิลป์ ตุลาธร)
ผู้ตรวจราชการกรม ปฏิบัติราชการแทน
อธิบดีกรมสวัสดิการและคุ้มครองแรงงาน

รายชื่อบุคลากรแนบท้ายใบอนุญาต
เป็นนิติบุคคลผู้ให้บริการตรวจวัดระดับความเข้มข้นของสารเคมีอันตรายในบรรยากาศของสถานที่ทำงาน
และสถานที่เก็บรักษาสารเคมีอันตราย
ของบริษัท เอส.พี.เอส. คอนซัลติ้ง เซอร์วิส จำกัด
ใบอนุญาตเลขที่ ๐๒๐๑-๐๓-๒๕๖๔-๐๐๐๑

[redacted]



ทั้งนี้ ตั้งแต่วันที่ ๑๔ ธันวาคม พ.ศ. ๒๕๖๗ ถึงวันที่ ๑๓ ธันวาคม พ.ศ. ๒๕๗๐

ให้ไว้ ณ วันที่ ๑๒ ธันวาคม พ.ศ. ๒๕๖๗

(นายศักดิ์ศิลป์ ตุลาธร)
ผู้ตรวจราชการกรม ปฏิบัติราชการแทน
อธิบดีกรมสวัสดิการและคุ้มครองแรงงาน

แบบ กภ.บญ
นิติบุคคล

กรมสวัสดิการและคุ้มครองแรงงาน

ใบอนุญาต

เป็นนิติบุคคลผู้ให้บริการวิเคราะห์ระดับความเข้มข้นของสารเคมีอันตราย

ในบรรยากาศของสถานที่ทำงานและสถานที่เก็บรักษาสารเคมีอันตราย

ใบอนุญาตเลขที่ ๐๒๐๒-๐๓-๒๕๖๔-๐๐๐๑

อนุญาตให้ บริษัท เอส.พี.เอส. คอนซัลติ้ง เซอร์วิส จำกัด

เลขทะเบียนนิติบุคคล ๐๑๐๕๕๒๔๐๐๗๓๒๔

ตั้งอยู่ เลขที่ ๗ ซอยพหลโยธิน ๒๔ ถนนพหลโยธิน แขวงจอมพล เขตจตุจักร กรุงเทพมหานคร

เป็นนิติบุคคลผู้ให้บริการด้านความปลอดภัย อาชีวอนามัย และสภาพแวดล้อมในการทำงาน ตามกฎกระทรวงกำหนดมาตรฐานในการบริหาร จัดการ และดำเนินการด้านความปลอดภัย อาชีวอนามัย และสภาพแวดล้อมในการทำงานเกี่ยวกับสารเคมีอันตราย พ.ศ. ๒๕๕๖ ในการเป็นผู้ให้บริการวิเคราะห์ระดับความเข้มข้นของสารเคมีอันตรายในบรรยากาศของสถานที่ทำงานและสถานที่เก็บรักษาสารเคมีอันตราย ประกอบกับกฎกระทรวงการขึ้นทะเบียนและการอนุญาตให้บริการเพื่อส่งเสริมความปลอดภัย อาชีวอนามัย และสภาพแวดล้อมในการทำงาน พ.ศ. ๒๕๖๔ แห่งพระราชบัญญัติความปลอดภัย อาชีวอนามัย และสภาพแวดล้อมในการทำงาน พ.ศ. ๒๕๕๔ โดยมีบุคลากร จำนวน ๖๔ ราย และรายการเครื่องมือวิเคราะห์ จำนวน ๒๑ เครื่อง ดังรายละเอียดแนบท้ายใบอนุญาตนี้

ทั้งนี้ ตั้งแต่วันที่ ๑๔ ธันวาคม พ.ศ. ๒๕๖๗ ถึงวันที่ ๑๓ ธันวาคม พ.ศ. ๒๕๗๐

ให้ไว้ ณ วันที่ ๑๒ ธันวาคม พ.ศ. ๒๕๖๗

(นายศักดิ์ศิลป์ ตุลาธร)
ผู้ตรวจราชการกรม ปฏิบัติราชการแทน
อธิบดีกรมสวัสดิการและคุ้มครองแรงงาน

รายการเครื่องมือวิเคราะห์แนบท้ายใบอนุญาต
เป็นนิติบุคคลผู้ให้บริการวิเคราะห์ระดับความเข้มข้นของสารเคมีอันตรายในบรรยากาศของสถานที่ทำงาน
และสถานที่เก็บรักษาสารเคมีอันตราย
ของบริษัท เอส.พี.เอส. คอนซัลติ้ง เซอร์วิส จำกัด
ใบอนุญาตเลขที่ ๐๒๐๒-๐๓-๒๕๖๔-๐๐๐๑

ลำดับที่	รายการเครื่องมือ	รายละเอียด		จำนวน (เครื่อง)
๑	Atomic Absorption Spectrometer (AAS)	ยี่ห้อ	PerkinElmer	๑
		รุ่น	PinAAcle 900T	
		Serial No.	PTCS14111103	
		ยี่ห้อ	PerkinElmer	๑
		รุ่น	PinAAcle 900Z	
		Serial No.	PZAS19090402	
๒	Inductively Coupled Plasma Optical Emission Spectroscopy (ICP-OES)	ยี่ห้อ	PerkinElmer	๑
		รุ่น	Optima 5300DV	
		Serial No.	077C7042401	
๓	Gas Chromatography (GC-FID)	ยี่ห้อ	Varian	๑
		รุ่น	CP-3800	
		Serial No.	00734	
๔	Gas Chromatography (GC-FID, MS)	ยี่ห้อ	Agilent	๑
		รุ่น	7890	
		Serial No.	CN10925120	
		ยี่ห้อ	PerkinElmer	๑
		รุ่น	Clarus 680	
		Serial No.	680S14042502	
		ยี่ห้อ	Agilent	๑
		รุ่น	6890N	
		Serial No.	CN10630014	
๕	Gas Chromatography (GC-FID, MS, PFPD)	ยี่ห้อ	Agilent	๑
		รุ่น	8890	
		Serial No.	CN1944A148	

ลำดับที่	รายการเครื่องมือ	รายละเอียด		จำนวน (เครื่อง)
๖	High Performance Liquid Chromatography (HPLC)	ยี่ห้อ รุ่น Serial No.	Waters e2695 M13SM7942A	๑
๗	Ion Chromatography (IC)	ยี่ห้อ รุ่น Serial No.	Dionex ICS-1500 Serial No. 03110527	๑
		ยี่ห้อ รุ่น Serial No.	Thermo Scientific Dionex Aquion 190840059	๑
๘	เครื่องชั่ง (Electronic Balance)	ยี่ห้อ รุ่น Serial No.	Mettler Toledo XS105DU 1126422905	๑
		ยี่ห้อ รุ่น Serial No.	Mettler Toledo XSR105DU B926859981	๑
		ยี่ห้อ รุ่น Serial No.	SARTORIUS BSA224S-CW 36591842 36591843	๒
๙	UV/VIS Spectrophotometer	ยี่ห้อ รุ่น Serial No.	PerkinElmer Lambda 365 365K7060203	๑
		ยี่ห้อ รุ่น Serial No.	PerkinElmer Lambda 25 501S14123010	๑
๑๐	Ion selective electrode	ยี่ห้อ รุ่น Serial No.	HANNA HI4109 N32226	๑
๑๑	FTIR Spectrometer	ยี่ห้อ รุ่น Serial No.	PerkinElmer SpectrumBX 70366	๑

ลำดับที่	รายการเครื่องมือ	รายละเอียด		จำนวน (เครื่อง)
๑๒	Portable Gas Detector	ยี่ห้อ รุ่น Serial No.	GMI PS200 394272 356643	๒
	<u>หมายเหตุ</u> เครื่องมือลำดับที่ ๑๒ ใช้สำหรับการวิเคราะห์คาร์บอนมอนอกไซด์ (Carbon monoxide: CO) ภายในห้องปฏิบัติการเท่านั้น			

ทั้งนี้ ตั้งแต่วันที่ ๑๔ ธันวาคม พ.ศ. ๒๕๖๗ ถึงวันที่ ๑๓ ธันวาคม พ.ศ. ๒๕๗๐

ให้ไว้ ณ วันที่ ๑๒ ธันวาคม พ.ศ. ๒๕๖๗

(นายศักดิ์ศิลป์ ตุลาธร)
ผู้ตรวจราชการกรม ปฏิบัติราชการแทน
อธิบดีกรมสวัสดิการและคุ้มครองแรงงาน

รายชื่อบุคลากรแนบท้ายใบอนุญาต
เป็นนิติบุคคลผู้ให้บริการวิเคราะห์ระดับความเข้มข้นของสารเคมีอันตรายในบรรยากาศของสถานที่ทำงาน
และสถานที่เก็บรักษาสารเคมีอันตราย
ของบริษัท เอส.พี.เอส. คอนซัลติ้ง เซอร์วิส จำกัด
ใบอนุญาตเลขที่ ๐๒๐๒-๐๓-๒๕๖๔-๐๐๐๑

[redacted]

[redacted]

[redacted]

ทั้งนี้ ตั้งแต่วันที่ ๑๔ ธันวาคม พ.ศ. ๒๕๖๗ ถึงวันที่ ๑๓ ธันวาคม พ.ศ. ๒๕๗๐

ให้ไว้ ณ วันที่ ๑๒ ธันวาคม พ.ศ. ๒๕๖๗

(นายศักดิ์ศิลป์ ตุลาธร)
ผู้ตรวจราชการกรม ปฏิบัติราชการแทน
อธิบดีกรมสวัสดิการและคุ้มครองแรงงาน

บริษัท สมาร์ท เอ็นไวรอนเมนทอล คอลซัลแตนท์ จำกัด

ที่ อก ๐๓๑๐(๑)/๙๙๖๓

กรมโรงงานอุตสาหกรรม
ถนนพระรามที่ ๖ แขวงทุ่งพญาไท
เขตราชเทวี กรุงเทพฯ ๑๐๔๐๐

๒๖ มิถุนายน ๒๕๖๖

เรื่อง ขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน

เรียน กรรมการผู้จัดการ บริษัท สมาร์ท เอ็นไวรอนเมนทอล คอนซัลแตนท์ จำกัด

อ้างถึง คำขอขึ้นทะเบียน/ต่ออายุ/เปลี่ยนแปลงบุคลากร และชนิดสารมลพิษของห้องปฏิบัติการวิเคราะห์เอกชน ลงวันที่ ๒๕ เมษายน ๒๕๖๖

สิ่งที่ส่งมาด้วย เอกสารแนบท้ายหนังสือรับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน บริษัท สมาร์ท เอ็นไวรอนเมนทอล คอนซัลแตนท์ จำกัด จำนวน ๑ แผ่น

ตามหนังสือที่อ้างถึง บริษัท สมาร์ท เอ็นไวรอนเมนทอล คอนซัลแตนท์ จำกัด ขอขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน พร้อมรายชื่อผู้ควบคุมดูแลห้องปฏิบัติการวิเคราะห์ เจ้าหน้าที่ประจำห้องปฏิบัติการวิเคราะห์ และรายการสารมลพิษที่จะทำการวิเคราะห์ ต่อกรมโรงงานอุตสาหกรรม นั้น

กรมโรงงานอุตสาหกรรมพิจารณาแล้ว ให้บริษัท สมาร์ท เอ็นไวรอนเมนทอล คอนซัลแตนท์ จำกัด ขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน มีเลขทะเบียน ว-๓๕๔ สถานที่ตั้งเลขที่ ๒๒๕/๖ หมู่ที่ ๓ ตำบลบ้านฉาง อำเภอเมืองปทุมธานี จังหวัดปทุมธานี โดยมีองค์ประกอบดังนี้

[redacted]

ตามสิ่งที่ส่งมาด้วย

หนังสือฉบับนี้มีอายุครั้งละ ๓ ปี นับจากวันที่กรมโรงงานอุตสาหกรรมออกหนังสือหากประสงค์จะต่ออายุหนังสือรับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน ให้ยื่นคำขอต่ออายุพร้อมเอกสารประกอบคำขอต่อกรมโรงงานอุตสาหกรรม ภายใน ๓๐ วัน ก่อนวันสิ้นอายุของหนังสือรับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชนทั้งนี้ สามารถยื่นคำขอผ่านระบบอิเล็กทรอนิกส์ได้ที่หน้าเว็บไซต์กรมโรงงานอุตสาหกรรม

จึงเรียนมาเพื่อทราบ

ขอแสดงความนับถือ

(นายประสม คำรงพงษ์)
ผู้อำนวยการกองวิจัยและเตือนภัยมลพิษโรงงาน
ปฏิบัติราชการแทนอธิบดีกรมโรงงานอุตสาหกรรม

กองวิจัยและเตือนภัยมลพิษโรงงาน
กลุ่มมาตรฐานวิธีการวิเคราะห์ทดสอบมลพิษและทะเบียนห้องปฏิบัติการ
โทร. ๐ ๒๔๓๐ ๖๓๑๒ ต่อ ๒๑๐๓-๕
โทรสาร ๐ ๒๔๓๐ ๖๓๑๒ ต่อ๒๑๙๙
ไปรษณีย์อิเล็กทรอนิกส์ saraban@diw.mail.go.th

เอกสารแนบท้ายหนังสือรับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน
บริษัท สมาร์ท เอ็นไวรอนเมนทอล คอนซัลแตนท์ จำกัด เลขทะเบียน ว-๓๕๔
ที่ อก ๐๓๑๐(๑)/๙๙๖๓ ลงวันที่ ๒๖ มิถุนายน ๒๕๖๖

ขอบข่ายสารมลพิษที่ได้รับขึ้นทะเบียนจากกรมโรงงานอุตสาหกรรม จำนวน ๔ รายการ

น้ำเสีย จำนวน 2 รายการ

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
1	pH	Electrometric Method [1]
2	Temperature	Laboratory and Field Methods [1]

น้ำใต้ดิน จำนวน 1 รายการ

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
1	pH	Electrometric Method [1]

อากาศเสีย (ปล่องระบาย) จำนวน 1 รายการ

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
1	Opacity	Ringelmann's Method [2]

เอกสารอ้างอิง

1. APHA, AWWA, WEF.**Standard Methods for the Examination of Water and Wastewater.** 23rd ed. Washington, DC: APHA, 2017.

2. กระทรวงอุตสาหกรรม. ประกาศกระทรวงอุตสาหกรรม เรื่อง กำหนดค่าปริมาณเขม่าควันที่เจือปนในอากาศที่ระบายออกจากปล่องของหม้อน้ำของโรงงาน พ.ศ. 2549. **ราชกิจจานุเบกษา**. 4 ธันวาคม 2549. เล่มที่ 123 ตอนพิเศษ 125ง.

ที่ อก ๐๓๑๐(๑)/ ๑๑๖๔๑

กรมโรงงานอุตสาหกรรม
ถนนพระรามที่ ๖ แขวงทุ่งพญาไท
เขตราชเทวี กรุงเทพฯ ๑๐๔๐๐

๐๙ สิงหาคม ๒๕๖๖

เรื่อง เปลี่ยนแปลงบุคลากรและสารมลพิษที่วิเคราะห์

เรียน กรรมการผู้จัดการ บริษัท สมาร์ท เอ็นไวรอนเมนทอล คอนซัลแตนท์ จำกัด

อ้างถึง คำขอขึ้นทะเบียน/ต่ออายุ/เปลี่ยนแปลงบุคลากร และชนิดสารมลพิษของห้องปฏิบัติการวิเคราะห์เอกชน ลงวันที่ ๙ พฤษภาคม ๒๕๖๖

สิ่งที่ส่งมาด้วย เอกสารแนบท้ายหนังสือเปลี่ยนแปลงบุคลากรและสารมลพิษที่วิเคราะห์ บริษัท สมาร์ท เอ็นไวรอนเมนทอล คอนซัลแตนท์ จำกัด จำนวน ๑ แผ่น

ตามหนังสือที่อ้างถึง บริษัท สมาร์ท เอ็นไวรอนเมนทอล คอนซัลแตนท์ จำกัด ห้องปฏิบัติการวิเคราะห์เอกชน เลขทะเบียน ว-๓๕๔ สถานที่ตั้งเลขที่ ๒๒๕/๖ หมู่ที่ ๓ ตำบลบ้านฉาง อำเภอเมืองปทุมธานี จังหวัดปทุมธานี ขอเปลี่ยนแปลงบุคลากรและสารมลพิษที่วิเคราะห์ ความละเอียดแจ้งแล้ว นั้น

กรมโรงงานอุตสาหกรรมพิจารณาแล้ว มีความเห็นดังนี้

[redacted]

๓. ให้เพิ่มขอบข่ายสารมลพิษที่วิเคราะห์ในน้ำเสีย ตามสิ่งที่ส่งมาด้วย

อนึ่ง หนังสือฉบับนี้จะหมดอายุพร้อมหนังสือรับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน คือในวันที่ ๒๖ มิถุนายน ๒๕๖๙ ทั้งนี้ สามารถยื่นคำขอผ่านระบบอิเล็กทรอนิกส์ได้ที่หน้าเว็บไซต์ กรมโรงงานอุตสาหกรรม

จึงเรียนมาเพื่อทราบ

ขอแสดงความนับถือ

(นายประสม ดำรงพงษ์)
ผู้อำนวยการกองวิจัยและเตือนภัยมลพิษโรงงาน
ปฏิบัติราชการแทนอธิบดีกรมโรงงานอุตสาหกรรม

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

เอกสารแนบท้ายหนังสือเปลี่ยนแปลงบุคลากรและสารมลพิษที่วิเคราะห์
บริษัท สมาร์ท เอ็นไวรอนเมนทอล คอนซัลแตนท์ จำกัด เลขทะเบียน ว-๓๕๔
ที่ อก ๐๓๑๐(๑)/ ๑๑๖๔๑ ลงวันที่ ๐๙ สิงหาคม ๒๕๖๖

ขอบข่ายสารมลพิษที่ได้รับขึ้นทะเบียนจากกรมโรงงานอุตสาหกรรม จำนวน ๔ รายการ

น้ำเสีย จำนวน 4 รายการ

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
1	Chemical Oxygen Demand	Closed Reflux, Titrimetric Method
2	Oil & Grease	Liquid-Liquid, Partition-Gravimetric Method
3	Total Dissolved Solids	Dried at 180 °C
4	Total Suspended Solids	Dried at 103-105 °C

เอกสารอ้างอิง

APHA, AWWA, WEF. Standard Methods for the Examination of Water and Wastewater. 23rd ed. Washington, DC: APHA, 2017.

เอกสารแนบท้ายมาตรฐานวิธีการวิเคราะห์ทดสอบมลพิษและทะเบียนห้องปฏิบัติการ กองวิจัยและเตือนภัยมลพิษโรงงาน กรมโรงงานอุตสาหกรรม โทร. ๐ ๒๔๓๐ ๖๓๑๒ ต่อ ๒๑๐๓-๕

ที่ อก ๐๓๑๐(๑)/ ๑๗๓๖๒

กรมโรงงานอุตสาหกรรม
ถนนพระรามที่ ๖ แขวงทุ่งพญาไท
เขตราชเทวี กรุงเทพฯ ๑๐๔๐๐

๒๖ ธันวาคม ๒๕๖๖

เรื่อง เปลี่ยนแปลงบุคลากรและสารมลพิษที่วิเคราะห์

เรียน กรรมการผู้จัดการ บริษัท สมาร์ท เอ็นไวรอนเมนทอล คอนซัลแตนท์ จำกัด

อ้างถึง คำขอขึ้นทะเบียน/ต่ออายุ/เปลี่ยนแปลงบุคลากร และชนิดสารมลพิษของห้องปฏิบัติการวิเคราะห์เอกชน ลงวันที่ ๒๕ กันยายน ๒๕๖๖

สิ่งที่ส่งมาด้วย เอกสารแนบท้ายหนังสือเปลี่ยนแปลงบุคลากรและสารมลพิษที่วิเคราะห์ บริษัท สมาร์ท เอ็นไวรอนเมนทอล คอนซัลแตนท์ จำกัด จำนวน ๑ แผ่น

ตามหนังสือที่อ้างถึง บริษัท สมาร์ท เอ็นไวรอนเมนทอล คอนซัลแตนท์ จำกัด ห้องปฏิบัติการวิเคราะห์เอกชน เลขทะเบียน ว-๓๕๔ สถานที่ตั้งเลขที่ ๒๒๕/๖ หมู่ที่ ๓ ตำบลบ้านฉาง อำเภอเมืองปทุมธานี จังหวัดปทุมธานี ขอเปลี่ยนแปลงบุคลากรและสารมลพิษที่วิเคราะห์ ความละเอียดแจ้งแล้ว นั้น

กรมโรงงานอุตสาหกรรมพิจารณาแล้ว มีความเห็นดังนี้ [redacted]

อนึ่ง หนังสือฉบับนี้จะหมดอายุพร้อมหนังสือรับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน คือในวันที่ ๒๖ มิถุนายน ๒๕๖๙ ทั้งนี้ สามารถยื่นคำขอผ่านระบบอิเล็กทรอนิกส์ได้ที่หน้าเว็บไซต์กรมโรงงานอุตสาหกรรม

จึงเรียนมาเพื่อทราบ

ขอแสดงความนับถือ

(นายประสม ดำรงพงษ์)
ผู้อำนวยการกองวิจัยและเตือนภัยมลพิษโรงงาน
ปฏิบัติราชการแทนอธิบดีกรมโรงงานอุตสาหกรรม

กองวิจัยและเตือนภัยมลพิษโรงงาน
กลุ่มมาตรฐานวิธีการวิเคราะห์ทดสอบมลพิษและทะเบียนห้องปฏิบัติการ
โทร. ๐ ๒๔๓๐ ๖๓๑๒ ต่อ ๒๑๐๓-๕
โทรสาร ๐ ๒๔๓๐ ๖๓๑๒ ต่อ๒๑๙๙
ไปรษณีย์อิเล็กทรอนิกส์ saraban@diw.mail.go.th

Green Industry
"อุตสาหกรรมก้าวไกล ประเทศไทยก้าวหน้า ร่วมกันพัฒนา อุตสาหกรรมสีเขียว"

เอกสารแนบท้ายหนังสือเปลี่ยนแปลงบุคลากรและสารมลพิษที่วิเคราะห์
บริษัท สมาร์ท เอ็นไวรอนเมนทอล คอนซัลแตนท์ จำกัด เลขทะเบียน ว-๓๕๔
ที่ อก ๐๓๑๐(๑)/ ๑๗๓๖๒ ลงวันที่ ๒๖ ธันวาคม ๒๕๖๖

ขอบข่ายสารมลพิษที่ได้รับขึ้นทะเบียนจากกรมโรงงานอุตสาหกรรมจำนวน ๖ รายการ

น้ำเสีย จำนวน 2 รายการ

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
1	Free Chlorine	Iodometric Method[1]
2	Sulfide	Iodometric Method[1]

อากาศเสีย (ปล่องระบาย) จำนวน 4 รายการ

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
1	Carbon Monoxide	Instrument Analyzer [2]
2	Oxides of Nitrogen	Instrument Analyzer [2]
3	Sulfur Dioxide	Instrument Analyzer [2]
4	Total Suspended Particulate	Isokinetic Sampling, Gravimetric Method [2]

เอกสารอ้างอิง

1. APHA, AWWA, WEF. **Standard Methods for the Examination of Water and Wastewater.** 23rd ed. Washington, DC: APHA, 2017.

2. United States Environmental Protection Agency. **Standards of Performance for New Stationary Sources.** 40 CFR 60. Appendix A, 2017.

(นายวิชัย ผลวิรัยชัย)
นักวิทยาศาสตร์ชำนาญการ รักษาราชการแทน
ผู้อำนวยการกลุ่มมาตรฐานวิธีการวิเคราะห์ทดสอบมลพิษ
และทะเบียนห้องปฏิบัติการ
25 ธ.ค. 66

ที่ อก ๐๓๑๐(๑)/ ๖ ๓ ๓

กรมโรงงานอุตสาหกรรม
ถนนพระรามที่ ๖ แขวงทุ่งพญาไท
เขตราชเทวี กรุงเทพฯ ๑๐๔๐๐

๒๔ มกราคม ๒๕๖๗

เรื่อง เปลี่ยนแปลงบุคลากรของห้องปฏิบัติการวิเคราะห์

เรียน กรรมการผู้จัดการ บริษัท สมาร์ท เอ็นไวรอนเมนทอล คอนซัลแตนท์ จำกัด

อ้างถึง คำขอขึ้นทะเบียน/ต่ออายุ/เปลี่ยนแปลงบุคลากร และชนิดสารมลพิษของห้องปฏิบัติการวิเคราะห์เอกชน ลงวันที่ ๓ มกราคม ๒๕๖๗

ตามหนังสือที่อ้างถึง บริษัท สมาร์ท เอ็นไวรอนเมนทอล คอนซัลแตนท์ จำกัด ห้องปฏิบัติการวิเคราะห์เอกชน เลขทะเบียน ว-๓๕๔ สถานที่ตั้งเลขที่ ๒๒๕/๖ หมู่ที่ ๓ ตำบลบ้านฉาง อำเภอเมืองปทุมธานี จังหวัดปทุมธานี ขอเปลี่ยนแปลงบุคลากรของห้องปฏิบัติการวิเคราะห์ ความละเอียดแจ้งแล้ว นั้น

กรมโรงงานอุตสาหกรรมพิจารณาแล้ว ให้เพิ่มผู้ควบคุมดูแลห้องปฏิบัติการวิเคราะห์ จำนวน ๑ ราย ได้แก่ [redacted]

อนึ่ง หนังสือฉบับนี้จะหมดอายุพร้อมหนังสือรับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน คือในวันที่ ๒๖ มิถุนายน ๒๕๖๙ ทั้งนี้ สามารถยื่นคำขอผ่านระบบอิเล็กทรอนิกส์ได้ที่หน้าเว็บไซต์ กรมโรงงานอุตสาหกรรม

จึงเรียนมาเพื่อทราบ

ขอแสดงความนับถือ

(นายประสม ดำรงพงษ์)
ผู้อำนวยการกองวิจัยและเตือนภัยมลพิษโรงงาน
ปฏิบัติราชการแทนอธิบดีกรมโรงงานอุตสาหกรรม

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

ที่ อก ๐๓๑๐(๑)/ ๓ ๐ ๙๐

กรมโรงงานอุตสาหกรรม
ถนนพระรามที่ ๖ แขวงทุ่งพญาไท
เขตราชเทวี กรุงเทพฯ ๑๐๔๐๐

๒๗ มีนาคม ๒๕๖๗

เรื่อง เปลี่ยนแปลงสารมลพิษที่วิเคราะห์

เรียน กรรมการผู้จัดการ บริษัท สมาร์ท เอ็นไวรอนเมนทอล คอนซัลแตนท์ จำกัด

อ้างถึง คำขอขึ้นทะเบียน/ต่ออายุ/เปลี่ยนแปลงบุคลากร และชนิดสารมลพิษของห้องปฏิบัติการวิเคราะห์เอกชน ลงวันที่ ๓๑ มกราคม ๒๕๖๗

สิ่งที่ส่งมาด้วย เอกสารแนบท้ายหนังสือเปลี่ยนแปลงสารมลพิษที่วิเคราะห์
บริษัท สมาร์ท เอ็นไวรอนเมนทอล คอนซัลแตนท์ จำกัด จำนวน ๑ แผ่น

ตามคำขอที่อ้างถึง บริษัท สมาร์ท เอ็นไวรอนเมนทอล คอนซัลแตนท์ จำกัด ห้องปฏิบัติการวิเคราะห์เอกชน เลขทะเบียน ว-๓๕๔ สถานที่ตั้งเลขที่ ๒๒๕/๖ หมู่ที่ ๓ ตำบลบ้านฉาง อำเภอเมืองปทุมธานี จังหวัดปทุมธานี ขอเปลี่ยนแปลงสารมลพิษที่วิเคราะห์ ต่อกรมโรงงานอุตสาหกรรม นั้น

กรมโรงงานอุตสาหกรรมพิจารณาแล้ว ให้บริษัท สมาร์ท เอ็นไวรอนเมนทอล คอนซัลแตนท์ จำกัด เพิ่มขอบข่ายสารมลพิษที่วิเคราะห์ในน้ำ/น้ำเสีย ตามสิ่งที่ส่งมาด้วย

อนึ่ง หนังสือฉบับนี้จะหมดอายุพร้อมหนังสือรับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน คือในวันที่ ๒๖ มิถุนายน ๒๕๖๙

จึงเรียนมาเพื่อทราบ

ขอแสดงความนับถือ

(นายพรยศ กลั่นกรอง)
รองอธิบดี ปฏิบัติราชการแทน
อธิบดีกรมโรงงานอุตสาหกรรม

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

เอกสารแนบท้ายหนังสือเปลี่ยนแปลงสารมลพิษที่วิเคราะห์

บริษัท สมาร์ท เอ็นไวรอนเมนทอล คอนซัลแตนท์ จำกัด เลขทะเบียน ว-๓๕๔

ที่ อก ๐๓๑๐(๑)/ ๓๐๙๐ ลงวันที่ ๒๗ มีนาคม ๒๕๖๗

ขอบข่ายสารมลพิษที่ได้รับขึ้นทะเบียนจากกรมโรงงานอุตสาหกรรม จำนวน ๑ รายการ

น้ำ/น้ำเสีย จำนวน 1 รายการ

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
1	Biochemical Oxygen Demand	5-Day BOD Test, Azide Modification Method

เอกสารอ้างอิง

APHA, AWWA, WEF.Standard Methods for the Examination of Water and Wastewater. 23rd ed. Washington, DC: APHA, 2017.

ที่ อก ๐๓๑๐(๑)/ ๕๐๖

กรมโรงงานอุตสาหกรรม
ถนนพระรามที่ ๖ แขวงทุ่งพญาไท
เขตราชเทวี กรุงเทพฯ ๑๐๔๐๐

๑๘ มกราคม ๒๕๖๗

เรื่อง ต่ออายุหนังสือรับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน

เรียน กรรมการผู้จัดการ บริษัท สเปเชี่ยล แล็บ เอ็นไว แอนด์ คอนซัลแตนท์ จำกัด

อ้างถึง คำขอขึ้นทะเบียน/ต่ออายุ/เปลี่ยนแปลงบุคลากร และชนิดสารมลพิษของห้องปฏิบัติการวิเคราะห์เอกชน ลงวันที่ ๑ พฤศจิกายน ๒๕๖๖

สิ่งที่ส่งมาด้วย เอกสารแนบท้ายหนังสือต่ออายุรับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน บริษัท สเปเชี่ยล แล็บ เอ็นไว แอนด์ คอนซัลแตนท์ จำกัด จำนวน ๒ แผ่น

ตามหนังสือที่อ้างถึง บริษัท สเปเชี่ยล แล็บ เอ็นไว แอนด์ คอนซัลแตนท์ จำกัด ห้องปฏิบัติการวิเคราะห์เอกชน เลขทะเบียน ว-๑๓๓ สถานที่ตั้งเลขที่ ๔๗/๙๑-๙๓ หมู่ที่ ๓ ตำบลท่าอิฐ อำเภอปากเกร็ด จังหวัดนนทบุรี ต่อกรมโรงงานอุตสาหกรรม นั้น

กรมโรงงานอุตสาหกรรมพิจารณาแล้ว ให้บริษัท สเปเชี่ยล แล็บ เอ็นไว แอนด์ คอนซัลแตนท์ จำกัด ต่ออายุหนังสือรับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน โดยมีองค์ประกอบดังนี้

[redacted]

ค. ขอบข่ายสารมลพิษที่ได้รับขึ้นทะเบียนให้วิเคราะห์ในน้ำเสีย ตามสิ่งที่ส่งมาด้วย

หนังสือ...

หนังสือฉบับนี้จะหมดอายุในวันที่ ๒๕ มกราคม ๒๕๗๐ หากประสงค์จะต่ออายุหนังสือรับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน ให้ยื่นคำขอต่ออายุพร้อมเอกสารประกอบคำขอต่อกรมโรงงานอุตสาหกรรมภายใน ๓๐ วัน ก่อนวันสิ้นอายุของหนังสือรับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน ทั้งนี้ สามารถยื่นคำขอผ่านระบบอิเล็กทรอนิกส์ได้ที่หน้าเว็บไซต์กรมโรงงานอุตสาหกรรม

จึงเรียนมาเพื่อทราบ

ขอแสดงความนับถือ

(นายศิระ จันทร์เฉิด)
นักวิทยาศาสตร์เชี่ยวชาญ รักษาราชการแทน
ผู้อำนวยการกองวิจัยและเตือนภัยมลพิษโรงงาน
ปฏิบัติราชการแทนอธิบดีกรมโรงงานอุตสาหกรรม

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

เอกสารแนบท้ายหนังสือต่ออายุรับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน
บริษัท สเปเชี่ยล แล็บ เอ็นไว แอนด์ คอนซัลแตนท์ จำกัด เลขทะเบียน ว-๑๓๓
ที่ อก ๐๓๑๐(๑)/ ๕๐๖ ลงวันที่ ๑๘ มกราคม ๒๕๖๗

ขอบข่ายสารมลพิษที่ได้รับขึ้นทะเบียนจากกรมโรงงานอุตสาหกรรม จำนวน ๒๖ รายการ

น้ำเสีย จำนวน 26 รายการ

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
1	Arsenic	Digestion, Hydride Generation/Atomic Absorption Spectrometric Method[2]
2	Barium	Digestion, Direct Nitrous Oxide-Acetylene Flame Method[2]
3	Biochemical Oxygen Demand	1) 5-Day BOD Test, Azide Modification Method[2] 2) 5-Day BOD Test, Membrane Electrode Method[2]
4	Cadmium	Digestion, Direct Air-Acetylene Flame Method[2]
5	Chemical Oxygen Demand	Closed Reflux, Colorimetric Method[2]
6	Color	ADMI Weighted-Ordinate Spectrophotometric Method[2]
7	Copper	Digestion, Direct Air-Acetylene Flame Method[2]
8	Cyanide	Distillation, Colorimetric Method[2]
9	Formaldehyde	Distillation, Colorimetric Method[1]
10	Free Chlorine	DPD Colorimetric Method[2]
11	Hexavalent Chromium	Colorimetric Method[2]
12	Lead	Digestion, Direct Air-Acetylene Flame Method[2]
13	Manganese	Digestion, Direct Air-Acetylene Flame Method[2]
14	Mercury	Digestion, Cold-Vapor Atomic Absorption Spectrometric Method[2]
15	Nickel	Digestion, Direct Air-Acetylene Flame Method[2]
16	Oil & Grease	Liquid-Liquid, Partition-Gravimetric Method[2]
17	pH	Electrometric Method[2]
18	Phenols	1) Distillation, Chloroform Extraction Method[2] 2) Distillation, Direct Photometric Method[2]
19	Selenium	Digestion, Hydride Generation/Atomic Absorption Spectrometric Method[2]
20	Sulfide	Iodometric Method[2]
21	Temperature	Laboratory and Field Methods[2]
22	Total Dissolved Solids	Dried at 180 °C[2]

23 Total Kjeldahl Nitrogen...

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
23	Total Kjeldahl Nitrogen	Macro-Kjeldahl Method[2]
24	Total Suspended Solids	Dried from 103-105 °C[2]
25	Trivalent Chromium	Digestion, Direct Air-Acetylene Flame Method; Colorimetric Method; Calculation[2]
26	Zinc	Digestion, Direct Air-Acetylene Flame Method[2]

เอกสารอ้างอิง

1. สมาคมวิศวกรรมสิ่งแวดล้อมแห่งประเทศไทย. **คู่มือวิเคราะห์น้ำเสีย.** พิมพ์ครั้งที่ 4. กรุงเทพฯ: เรือนแก้วการพิมพ์, 2547.

2. APHA, AWWA, WEF. **Standard Methods for the Examination of Water and Wastewater.** 24th ed. Washington, DC: APHA, 2023.

ที่ อก ๐๓๑๐(๑)/ ๑ ๓ ๘ ๕ ๒

กรมโรงงานอุตสาหกรรม
ถนนพระรามที่ ๖ แขวงทุ่งพญาไท
เขตราชเทวี กรุงเทพฯ ๑๐๔๐๐

๒๗ กันยายน ๒๕๖๕

เรื่อง ต่ออายุหนังสือรับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน

เรียน กรรมการผู้จัดการ บริษัท เซ้าท์อีสต์ เอเชี่ยน ลาบอราทอรี่ย์ จำกัด

อ้างถึง คำขอขึ้นทะเบียน/ต่ออายุ/เปลี่ยนแปลงบุคลากร และชนิดสารมลพิษของห้องปฏิบัติการวิเคราะห์เอกชน ลงวันที่ ๘ สิงหาคม ๒๕๖๕

สิ่งที่ส่งมาด้วย เอกสารแนบท้ายหนังสือรับต่ออายุขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน บริษัท เซ้าท์อีสต์ เอเชี่ยน ลาบอราทอรี่ย์ จำกัด จำนวน ๑ แผ่น

ตามหนังสือที่อ้างถึง บริษัท เซ้าท์อีสต์ เอเชี่ยน ลาบอราทอรี่ย์ จำกัด ขอต่ออายุหนังสือรับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน เลขทะเบียน ว-๒๙๑ สถานที่ตั้งเลขที่ ๙๙๙/๙๙ ถนนพระรามที่ ๙ แขวงสวนหลวง เขตสวนหลวง กรุงเทพมหานคร ต่อกรมโรงงานอุตสาหกรรม นั้น

กรมโรงงานอุตสาหกรรมพิจารณาแล้ว ให้บริษัท เซ้าท์อีสต์ เอเชี่ยน ลาบอราทอรี่ย์ จำกัด ต่ออายุหนังสือรับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน โดยมีองค์ประกอบดังนี้

[redacted]

ค. ขอบข่ายสารมลพิษที่ได้รับขึ้นทะเบียนให้วิเคราะห์ในน้ำเสีย ตามสิ่งที่ส่งมาด้วย

หนังสือฉบับนี้...

หนังสือฉบับนี้จะหมดอายุในวันที่ ๑๔ สิงหาคม ๒๕๖๘ หากประสงค์จะต่ออายุหนังสือรับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน ให้ยื่นคำขอต่ออายุพร้อมเอกสารประกอบคำขอต่อกรมโรงงานอุตสาหกรรม ภายใน ๓๐ วัน ก่อนวันสิ้นอายุของหนังสือรับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน ทั้งนี้ สามารถยื่นคำขอผ่านระบบอิเล็กทรอนิกส์ได้ที่หน้าเว็บไซต์กรมโรงงานอุตสาหกรรม ตาม QR Code ท้ายหนังสือฉบับนี้

จึงเรียนมาเพื่อทราบ

ขอแสดงความนับถือ

(นางจินตา เดชะศรินทร์)
ผู้อำนวยการกองวิจัยและเตือนภัยมลพิษโรงงาน
ปฏิบัติราชการแทนอธิบดีกรมโรงงานอุตสาหกรรม

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

ยื่นคำขอผ่านระบบอิเล็กทรอนิกส์

เอกสารแนบท้ายหนังสือรับต่ออายุขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน
บริษัท เซ้าท์อีสต์ เอเชี่ยน ลาบอราทอรี่ย์ จำกัด เลขทะเบียน ว-๒๙๑
ที่ อก ๐๓๑๐(๑)/ ๑๓๘๕๒ ลงวันที่ ๒๗ กันยายน ๒๕๖๔

ขอบข่ายสารมลพิษที่ได้รับขึ้นทะเบียนจากกรมโรงงานอุตสาหกรรม จำนวน ๑๕ รายการ

น้ำเสีย จำนวน 15 รายการ

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
1	Arsenic	Digestion, Inductively Coupled Plasma Method
2	Barium	Digestion, Inductively Coupled Plasma Method
3	Biochemical Oxygen Demand	5-Day BOD Test, Azide Modification Method
4	Cadmium	Digestion, Inductively Coupled Plasma Method
5	Chemical Oxygen Demand	Closed Reflux, Colorimetric Method
6	Copper	Digestion, Inductively Coupled Plasma Method
7	Lead	Digestion, Inductively Coupled Plasma Method
8	Manganese	Digestion, Inductively Coupled Plasma Method
9	Nickel	Digestion, Inductively Coupled Plasma Method
10	Oil & Grease	Liquid-Liquid, Partition-Gravimetric Method
11	pH	Electrometric Method
12	Selenium	Digestion, Inductively Coupled Plasma Method
13	Total Dissolved Solids	Dried at 180 °C
14	Total Suspended Solids	Dried at 103-105 °C
15	Zinc	Digestion, Inductively Coupled Plasma Method

เอกสารอ้างอิง

APHA, AWWA, WEF. **Standard Methods for the Examination of Water and Wastewater.** 23rd ed. Washington, DC: APHA, 2017

เอกสารใบอนุญาตนิติบุคคลผู้ให้บริการตรวจวัดและ
วิเคราะห์สภาวะการทำงานเกี่ยวกับ
ระดับความร้อน แสงสว่าง และเสียง

แบบ กภ.บญ
นิติบุคคล

กรมสวัสดิการและคุ้มครองแรงงาน

ใบอนุญาต

เป็นนิติบุคคลผู้ให้บริการตรวจวัดและวิเคราะห์สภาวะการทำงานเกี่ยวกับระดับความร้อน

ใบอนุญาตเลขที่ ๐๔๐๑-๐๓-๒๕๖๖-๐๐๘๒

อนุญาตให้ บริษัท สมาร์ท เอ็นไวรอนเมนทอล คอนซัลแตนท์ จำกัด

เลขทะเบียนนิติบุคคล ๐๑๐๓๕๕๖๔๐๒๕๘๔๑

ตั้งอยู่เลขที่ ๒๒๕/๖ หมู่ที่ ๓ ตำบลบ้านฉาง อำเภอเมืองปทุมธานี จังหวัดปทุมธานี

เป็นนิติบุคคลผู้ให้บริการด้านความปลอดภัย อาชีวอนามัย และสภาพแวดล้อมในการทำงาน ตามกฎกระทรวงกำหนดมาตรฐานในการบริหาร จัดการ และดำเนินการด้านความปลอดภัย อาชีวอนามัย และสภาพแวดล้อมในการทำงานเกี่ยวกับความร้อน แสงสว่าง และเสียง พ.ศ. ๒๕๕๙ ในการตรวจวัดและวิเคราะห์สภาวะการทำงานเกี่ยวกับระดับความร้อน ประกอบกับกฎกระทรวงการขึ้นทะเบียนและการอนุญาตให้บริการเพื่อส่งเสริมความปลอดภัย อาชีวอนามัย และสภาพแวดล้อมในการทำงาน พ.ศ. ๒๕๖๔ แห่งพระราชบัญญัติความปลอดภัย อาชีวอนามัย และสภาพแวดล้อมในการทำงาน พ.ศ. ๒๕๕๔ โดยมีบุคลากร จำนวน ๑ ราย และรายการเครื่องมือตรวจวัด จำนวน ๑ เครื่อง ดังรายละเอียดแนบท้ายใบอนุญาตนี้

ทั้งนี้ ตั้งแต่วันที่ ๑๘ สิงหาคม พ.ศ. ๒๕๖๖ ถึงวันที่ ๑๗ สิงหาคม พ.ศ. ๒๕๖๙

ให้ไว้ ณ วันที่ ๑๘ สิงหาคม พ.ศ. ๒๕๖๖

(นายสมพจน์ กวางแก้ว)
รองอธิบดี ปฏิบัติราชการแทน
อธิบดีกรมสวัสดิการและคุ้มครองแรงงาน

รายชื่อบุคลากรแนบท้ายใบอนุญาต
เป็นนิติบุคคลผู้ให้บริการตรวจวัดและวิเคราะห์สภาวะการทำงานเกี่ยวกับระดับความร้อน
ของบริษัท สมาร์ท เอ็นไวรอนเมนทอล คอนซัลแตนท์ จำกัด
ใบอนุญาตเลขที่ ๐๔๐๑-๐๓-๒๕๖๖-๐๐๘๒

[redacted]

ทั้งนี้ ตั้งแต่วันที่ ๑๘ สิงหาคม พ.ศ. ๒๕๖๖ ถึงวันที่ ๑๗ สิงหาคม พ.ศ. ๒๕๖๙

ให้ไว้ ณ วันที่ ๑๘ สิงหาคม พ.ศ. ๒๕๖๖

(นายสมพจน์ กวางแก้ว)
รองอธิบดี ปฏิบัติราชการแทน
อธิบดีกรมสวัสดิการและคุ้มครองแรงงาน

รายชื่อบุคลากร (เพิ่มเติม)
แนบท้ายใบอนุญาตเป็นนิติบุคคลผู้ให้บริการตรวจวัดและวิเคราะห์สภาวะการทำงานเกี่ยวกับระดับความร้อน
ของบริษัท สมาร์ท เอ็นไวรอนเมนทอล คอนซัลแตนท์ จำกัด
ใบอนุญาตเลขที่ ๐๔๐๑-๐๓-๒๕๖๖-๐๐๘๒

[redacted]

ทั้งนี้ ตั้งแต่วันที่ ๑๖ พฤษภาคม พ.ศ. ๒๕๖๗ ถึงวันที่ ๑๗ สิงหาคม พ.ศ. ๒๕๖๙

ให้ไว้ ณ วันที่ ๑๖ พฤษภาคม พ.ศ. ๒๕๖๗

(นางสาวปรียานันท์ ลิขิตศานต์)
ผู้ตรวจราชการกรม ปฏิบัติราชการแทน
อธิบดีกรมสวัสดิการและคุ้มครองแรงงาน

แบบ กภ.บญ
นิติบุคคล

กรมสวัสดิการและคุ้มครองแรงงาน

ใบอนุญาต

เป็นนิติบุคคลผู้ให้บริการตรวจวัดและวิเคราะห์สภาวะการทำงานเกี่ยวกับระดับแสงสว่าง

ใบอนุญาตเลขที่ ๐๔๐๒-๐๓-๒๕๖๖-๐๐๙๐

อนุญาตให้ บริษัท สมาร์ท เอ็นไวรอนเมนทอล คอนซัลแตนท์ จำกัด

เลขทะเบียนนิติบุคคล ๐๑๓๕๕๖๔๐๒๕๘๑

ตั้งอยู่เลขที่ ๒๒๕/๖ หมู่ที่ ๓ ตำบลบ้านฉาง อำเภอเมืองปทุมธานี จังหวัดปทุมธานี

เป็นนิติบุคคลผู้ให้บริการด้านความปลอดภัย อาชีวอนามัย และสภาพแวดล้อมในการทำงาน ตามกฎกระทรวงกำหนดมาตรฐานในการบริหาร จัดการ และดำเนินการด้านความปลอดภัย อาชีวอนามัย และสภาพแวดล้อมในการทำงานเกี่ยวกับความร้อน แสงสว่าง และเสียง พ.ศ. ๒๕๕๙ ในการตรวจวัดและวิเคราะห์สภาวะการทำงานเกี่ยวกับระดับแสงสว่าง ประกอบกับกฎกระทรวงการขึ้นทะเบียนและการอนุญาตให้บริการเพื่อส่งเสริมความปลอดภัย อาชีวอนามัย และสภาพแวดล้อมในการทำงาน พ.ศ. ๒๕๖๔ แห่งพระราชบัญญัติความปลอดภัย อาชีวอนามัย และสภาพแวดล้อมในการทำงาน พ.ศ. ๒๕๕๔ โดยมีบุคลากร จำนวน ๑ ราย และรายการเครื่องมือตรวจวัด จำนวน ๑ เครื่อง ดังรายละเอียดแนบท้ายใบอนุญาตนี้

ทั้งนี้ ตั้งแต่วันที่ ๑๘ สิงหาคม พ.ศ. ๒๕๖๖ ถึงวันที่ ๑๗ สิงหาคม พ.ศ. ๒๕๖๙

ให้ไว้ ณ วันที่ ๑๘ สิงหาคม พ.ศ. ๒๕๖๖

(นายสมพจน์ กวางแก้ว)
รองอธิบดี ปฏิบัติราชการแทน
อธิบดีกรมสวัสดิการและคุ้มครองแรงงาน

รายชื่อบุคลากรแนบท้ายใบอนุญาต
เป็นนิติบุคคลผู้ให้บริการตรวจวัดและวิเคราะห์สภาวะการทำงานเกี่ยวกับระดับแสงสว่าง
ของบริษัท สมาร์ท เอ็นไวรอนเมนทอล คอนซัลแตนท์ จำกัด
ใบอนุญาตเลขที่ ๐๔๐๒-๐๓-๒๕๖๖-๐๐๙๐

[redacted]

ทั้งนี้ ตั้งแต่วันที่ ๑๘ สิงหาคม พ.ศ. ๒๕๖๖ ถึงวันที่ ๑๗ สิงหาคม พ.ศ. ๒๕๖๙

ให้ไว้ ณ วันที่ ๑๘ สิงหาคม พ.ศ. ๒๕๖๖

(นายสมพจน์ กวางแก้ว)
รองอธิบดี ปฏิบัติราชการแทน
อธิบดีกรมสวัสดิการและคุ้มครองแรงงาน

รายชื่อบุคลากร (เพิ่มเติม)
แนบท้ายใบอนุญาตเป็นนิติบุคคลผู้ให้บริการตรวจวัดและวิเคราะห์สภาวะการทำงานเกี่ยวกับระดับแสงสว่าง
ของบริษัท สมาร์ท เอ็นไวรอนเมนทอล คอนซัลแตนท์ จำกัด
ใบอนุญาตเลขที่ ๐๔๐๒-๐๓-๒๕๖๖-๐๐๙๐

[redacted]

ทั้งนี้ ตั้งแต่วันที่ ๑๖ พฤษภาคม พ.ศ. ๒๕๖๗ ถึงวันที่ ๑๗ สิงหาคม พ.ศ. ๒๕๖๙

ให้ไว้ ณ วันที่ ๑๖ พฤษภาคม พ.ศ. ๒๕๖๗

(นางสาวปรียานันท์ ลิขิตศานต์)
ผู้ตรวจราชการกรม ปฏิบัติราชการแทน
อธิบดีกรมสวัสดิการและคุ้มครองแรงงาน

แบบ กภ.บญ
นิติบุคคล

กรมสวัสดิการและคุ้มครองแรงงาน

ใบอนุญาต

เป็นนิติบุคคลผู้ให้บริการตรวจวัดและวิเคราะห์สภาวะการทำงานเกี่ยวกับระดับเสียง

ใบอนุญาตเลขที่ ๐๔๐๓-๐๓-๒๕๖๖-๐๐๘๔

อนุญาตให้ บริษัท สมาร์ท เอ็นไวรอนเมนทอล คอนซัลแตนท์ จำกัด
เลขทะเบียนนิติบุคคล ๐๑๓๕๕๖๔๐๒๕๘๔๑
ตั้งอยู่เลขที่ ๒๒๕/๖ หมู่ที่ ๓ ตำบลบ้านฉาง อำเภอเมืองปทุมธานี จังหวัดปทุมธานี
เป็นนิติบุคคลผู้ให้บริการด้านความปลอดภัย อาชีวอนามัย และสภาพแวดล้อมในการทำงาน ตามกฎกระทรวง กำหนดมาตรฐานในการบริหาร จัดการ และดำเนินการด้านความปลอดภัย อาชีวอนามัย และสภาพแวดล้อมในการทำงานเกี่ยวกับความร้อน แสงสว่าง และเสียง พ.ศ. ๒๕๕๙ ในการตรวจวัดและวิเคราะห์สภาวะการทำงานเกี่ยวกับระดับเสียง ประกอบกับกฎกระทรวงการขึ้นทะเบียนและการอนุญาตให้บริการเพื่อส่งเสริมความปลอดภัย อาชีวอนามัย และสภาพแวดล้อมในการทำงาน พ.ศ. ๒๕๖๔ แห่งพระราชบัญญัติความปลอดภัย อาชีวอนามัย และสภาพแวดล้อมในการทำงาน พ.ศ. ๒๕๕๔ โดยมีบุคลากร จำนวน ๑ ราย และรายการเครื่องมือตรวจวัด จำนวน ๓ เครื่อง ดังรายละเอียดแนบท้ายใบอนุญาตนี้

ทั้งนี้ ตั้งแต่วันที่ ๑๘ สิงหาคม พ.ศ. ๒๕๖๖ ถึงวันที่ ๑๗ สิงหาคม พ.ศ. ๒๕๖๙

ให้ไว้ ณ วันที่ ๑๘ สิงหาคม พ.ศ. ๒๕๖๖

(นายสมพจน์ กวางแก้ว)
รองอธิบดี ปฏิบัติราชการแทน
อธิบดีกรมสวัสดิการและคุ้มครองแรงงาน

รายชื่อบุคลากรแนบท้ายใบอนุญาต
เป็นนิติบุคคลผู้ให้บริการตรวจวัดและวิเคราะห์สภาวะการทำงานเกี่ยวกับระดับเสียง
ของบริษัท สมาร์ท เอ็นไวรอนเมนทอล คอนซัลแตนท์ จำกัด
ใบอนุญาตเลขที่ ๐๔๐๓-๐๓-๒๕๖๖-๐๐๘๔

[redacted]

ทั้งนี้ ตั้งแต่วันที่ ๑๘ สิงหาคม พ.ศ. ๒๕๖๖ ถึงวันที่ ๑๗ สิงหาคม พ.ศ. ๒๕๖๙

ให้ไว้ ณ วันที่ ๑๘ สิงหาคม พ.ศ. ๒๕๖๖

(นายสมพจน์ กวางแก้ว)
รองอธิบดี ปฏิบัติราชการแทน
อธิบดีกรมสวัสดิการและคุ้มครองแรงงาน

รายชื่อบุคลากร (เพิ่มเติม)
แนบท้ายใบอนุญาตเป็นนิติบุคคลผู้ให้บริการตรวจวัดและวิเคราะห์สภาวะการทำงานเกี่ยวกับระดับเสียง
ของบริษัท สมาร์ท เอ็นไวรอนเมนทอล คอนซัลแตนท์ จำกัด
ใบอนุญาตเลขที่ ๐๔๐๓-๐๓-๒๕๖๖-๐๐๘๔

[redacted]

ทั้งนี้ ตั้งแต่วันที่ ๑๖ พฤษภาคม พ.ศ. ๒๕๖๗ ถึงวันที่ ๑๗ สิงหาคม พ.ศ. ๒๕๖๙

ให้ไว้ ณ วันที่ ๑๖ พฤษภาคม พ.ศ. ๒๕๖๗

(นางสาวปรียานันท์ ลิขิตศานต์)
ผู้ตรวจราชการกรม ปฏิบัติราชการแทน
อธิบดีกรมสวัสดิการและคุ้มครองแรงงาน

บริษัท ปัญจพล พัลพ์ อินดัสตรี้ จำกัด (มหาชน)

ที่ อก ๐๓๑๐(๑)/ ๐ ๐ ๘

กรมโรงงานอุตสาหกรรม
ถนนพระรามที่ ๖ แขวงทุ่งพญาไท
เขตราชเทวี กรุงเทพฯ ๑๐๔๐๐

๒ มกราคม ๒๕๖๗

เรื่อง ต่ออายุหนังสือรับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน

เรียน กรรมการผู้จัดการ บริษัท ปัญจพล พัลพ์ อินดัสตรี้ จำกัด (มหาชน)

อ้างถึง คำขอขึ้นทะเบียน/ต่ออายุ/เปลี่ยนแปลงบุคลากร และชนิดสารมลพิษของห้องปฏิบัติการวิเคราะห์เอกชน ลงวันที่ ๑๕ พฤศจิกายน ๒๕๖๖

สิ่งที่ส่งมาด้วย เอกสารแนบท้ายหนังสือรับต่ออายุขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน บริษัท ปัญจพล พัลพ์ อินดัสตรี้ จำกัด (มหาชน) จำนวน ๑ แผ่น

ตามหนังสือที่อ้างถึง บริษัท ปัญจพล พัลพ์ อินดัสตรี้ จำกัด (มหาชน) ขอต่ออายุหนังสือรับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน เลขทะเบียน ร-๓๖๑ สถานที่ตั้งเลขที่ ๕๑/๑ หมู่ที่ ๓ ตำบลห่อหมก อำเภอบางไทร จังหวัดพระนครศรีอยุธยา ต่อกรมโรงงานอุตสาหกรรม นั้น

กรมโรงงานอุตสาหกรรมพิจารณาแล้ว ให้บริษัท ปัญจพล พัลพ์ อินดัสตรี้ จำกัด (มหาชน) ต่ออายุหนังสือรับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน โดยมีองค์ประกอบดังนี้

[redacted]

หนังสือฉบับนี้จะหมดอายุในวันที่ ๑๘ ธันวาคม ๒๕๖๙ หากประสงค์จะต่ออายุหนังสือรับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน ให้ยื่นคำขอต่ออายุพร้อมเอกสารประกอบคำขอต่อกรมโรงงานอุตสาหกรรม ภายใน ๓๐ วัน ก่อนวันสิ้นอายุของหนังสือรับขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน ทั้งนี้ สามารถยื่นคำขอผ่านระบบอิเล็กทรอนิกส์ได้ที่หน้าเว็บไซต์กรมโรงงานอุตสาหกรรม

จึงเรียนมาเพื่อทราบ

ขอแสดงความนับถือ

(นายประสม คำรงพงษ์)
ผู้อำนวยการกองวิจัยและเตือนภัยมลพิษโรงงาน
ปฏิบัติราชการแทนอธิบดีกรมโรงงานอุตสาหกรรม

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

เอกสารแนบท้ายหนังสือรับต่ออายุขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน
บริษัท ปัญจพล พัลพ์ อินดัสตรี้ จำกัด (มหาชน) เลขทะเบียน ร-๓๖๑
ที่ อก ๐๓๑๐(๑)/ ๐ ๐ ๘ ลงวันที่ ๒ มกราคม ๒๕๖๗

ขอบข่ายสารมลพิษที่ได้รับขึ้นทะเบียนจากกรมโรงงานอุตสาหกรรม จำนวน ๔ รายการ

น้ำเสีย จำนวน 4 รายการ

ลำดับที่	สารมลพิษ	วิธีวิเคราะห์
1	Biochemical Oxygen Demand	5-Day BOD Test, Azide Modification Method
2	Chemical Oxygen Demand	Closed Reflux, Titrimetric Method
3	pH	Electrometric Method
4	Total Suspended Solids	Dried at 103-105 °C

เอกสารอ้างอิง

APHA, AWWA, WEF. Standard Methods for the Examination of Water and Wastewater. 23rd ed. Washington, DC: APHA, 2017.

ภาคผนวก ง-2

เอกสารสอบเทียบเครื่องมือตรวจวัด

บริษัท เอส.พี.เอส. คอนซัลติ้ง เซอร์วิส จำกัด

ตารางสรุปรายการเอกสารสอบเทียบความถูกต้องของเครื่องมือเก็บตัวอย่าง
และเครื่องมือตรวจวิเคราะห์คุณภาพสิ่งแวดล้อม

ดัชนีการตรวจวัด	เครื่องมือเก็บตัวอย่าง	เครื่องมือตรวจวิเคราะห์
	ชื่อเครื่องมือ	ชื่อเครื่องมือ
1. คุณภาพอากาศในบรรยากาศ		
Total Suspended Particulate	High Volume Air Sampler No. B09, B16, B39, B42	Digital Balance
Sulfur Dioxide	Personal Pump SKC No. B02, B03, B09, R09 Rotameter No. L-B10	Spectrophotometer
Hydrogen Sulfide	Personal Pump SKC No. B05, B10, B11, B12 Rotameter No. L-B10	Spectrophotometer
Carbon Monoxide	Personal Pump SKC No. B03, B12, B88, B91 Rotameter No. L-B10	IR
Methyl Mercaptan	Personal Pump SKC No. B01, B07, B14, B15 Rotameter No. L-B10	GC/FPD
Dimethyl Disulfide	Personal Pump SKC No. B04, B06, B08, B13 Rotameter No. L-B10	GC/FPD
Nitrogen Dioxide	$NO/NO_2/NO_x$ Analyzer No. B01, B03, B10, B15	$NO/NO_2/NO_x$ Analyzer No. B01, B03, B10, B15
2. ระดับเสียงในบรรยากาศ		
L_{eq} 24 hr, L_{90} 24 hr, L_{max} และ L_{dn}	Acoustic Calibrator Sound Level Meter No. ACO-B032, B38, B42	-
3. คุณภาพอากาศจากปล่อง		
Total Suspended Particulate	Console No. B04, B05 Pitot Tube No. B04, B49	Digital Balance
Carbon Monoxide	Personal Pump SKC No. B06, B32 Rotameter No. H-B01, B09	IR
Sulfur Dioxide	Personal Pump SKC No. B12, B17 Rotameter No. H-B01, B09	-
Oxides of Nitrogen	Vacuum Gauge	Spectrophotometer
Hydrogen Sulfide	Personal Pump SKC No. B32, B79 Rotameter No. H- B01, B09	-
Chlorine	Personal Pump SKC No. B06 Rotameter No. H-B09	IC
Dimethyl Disulfide	Personal Pump SKC No. B12, B70 Rotameter No. L- B01, B09	GC/PFPD
Methyl Mercaptan	Personal Pump SKC No. B18, B32 Rotameter No. L- B01, B09	GC/PFPD
4. คุณภาพอากาศในสถานประกอบการ		
Sodium Hydroxide	Personal Pump SKC No. B12, B66 Rotameter No. H-B08	-
Hydrogen Sulfide	Personal Pump SKC No. B59, B91 Rotameter No. L-B08	IC
Sulfur Dioxide	Personal Pump SKC No. B88 Rotameter No. H-B08	-

คุณภาพอากาศในบรรยากาศ

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 : 3440

High Volume Air Sampler Data		Calibration Data		
Recorder No.	Blower No.	Date	Actual Flowrate (ft^3/min)	R^2
B01	B01	01/08/2025	y = 1.099x-3.517	0.999
B02	B02	01/08/2025	y = 1.142x-3.995	0.999
B03	B03	01/08/2025	y = 1.127x-5.756	0.997
B04	B04	01/08/2025	y = 1.137x-4.695	0.999
B05	B05	01/08/2025	y = 1.128x-5.472	0.999
B06	B06	01/08/2025	y = 1.177x-5.925	0.996
B07	B07	01/08/2025	y = 1.147x-5.407	0.999
B08	B08	01/08/2025	y = 1.152x-6.011	0.997
B09	B09	01/08/2025	y = 1.132x-4.325	0.998
B10	B10	07/08/2025	y = 1.123x-5.255	0.998
B11	B11	01/08/2025	y = 1.131x-3.867	0.997
B12	B12	01/08/2025	y = 1.128x-2.501	0.997
B13	B13	01/08/2025	y = 1.162x-4.037	0.996
B14	B14	01/08/2025	y = 1.144x-4.295	0.997
B15	B15	01/08/2025	y = 1.101x-3.061	0.998
B16	B16	07/08/2025	y = 1.039x-1.195	0.999
B17	B17	01/08/2025	y = 1.056x+0.573	0.998
B18	B18	01/08/2025	y = 1.176x-6.349	0.998
B19	B19	01/08/2025	y = 1.150x-4.805	0.996
B20	B20	04/08/2025	y = 1.043x+2.427	0.999
B21	B21	01/08/2025	y = 1.064x+0.460	0.997
B22	B22	01/08/2025	y = 1.146x-4.084	0.998
B23	B23	01/08/2025	y = 1.118x-2.441	0.999
B24	B24	01/08/2025	y = 1.085x-1.292	0.999
B25	B25	01/08/2025	Y = 1.074x+0.323	0.999
B26	B26	04/08/2025	y = 1.098x-3.782	0.997
B27	B27	01/08/2025	y = 1.173x-7.561	0.997
B28	B28	01/08/2025	y = 1.128x-5.410	0.998
B29	B29	01/08/2025	y = 1.134x-3.750	0.998
B30	B30	01/08/2025	y = 1.050x+1.266	0.999
B31	B31	04/08/2025	y = 1.166x-5.291	0.999
B32	B32	01/08/2025	y = 1.159x-4.739	0.996
B33	B33	01/08/2025	y = 1.173x-5.447	0.997
B34	B34	01/08/2025	y = 1.148x-4.099	0.999

Calibrated by : Adul Dangklom (Mr.Adul Dangklom)

Approved by : (Mr. Peera Detudom)

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S.P.S. CONSULTING SERVICE CO., LTD.
7 ซอยพหลโยธิน 24 ถนนพหลโยธิน แขวงจอมพล เขตจตุจักร กรุงเทพฯ 10900
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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 : 3440

High Volume Air Sampler Data		Calibration Data		
Recorder No.	Blower No.	Date	Actual Flowrate (ft^3/min)	R^2
B35	B35	01/08/2025	y = 1.126x-2.314	0.997
B36	B36	01/08/2025	y = 1.158x-3.625	0.999
B37	B37	01/08/2025	y = 1.071x-0.714	0.998
B38	B38	07/08/2025	y = 1.138x-6.470	0.999
B39	B39	07/08/2025	y = 1.074x-2.233	0.999
B40	B40	01/08/2025	y = 1.137x-4.281	0.998
B41	B41	01/08/2025	y = 1.124x-3.061	0.999
B42	B42	01/08/2025	y = 1.130x-3.831	0.998
B43	B43	04/08/2025	y = 1.098x-1.647	0.999
B44	B44	07/08/2025	y = 1.107x-2.029	0.997
R01	R01	01/08/2025	y = 1.027x+1.685	0.998
R02	R02	01/08/2025	y = 1.154x-5.444	0.998
R03	R03	01/08/2025	y = 1.174x-5.934	0.999
R04	R04	04/08/2025	y = 1.125x-3.465	0.997
R05	R05	01/08/2025	y = 1.097x+0.437	0.999
R06	R06	04/08/2025	y = 1.138x-2.560	0.997
R07	R07	01/08/2025	y = 1.046x-0.699	0.999
R08	R08	01/08/2025	y = 1.109x-3.582	0.997
R09	R09	01/08/2025	y = 1.088x-1.852	0.999
R10	R10	01/08/2025	y = 1.134x-4.535	0.996
R11	R11	01/08/2025	y = 1.170x-6.929	0.998
R12	R12	01/08/2025	y = 1.151x-4.183	0.999
R13	R13	01/08/2025	y = 1.117x-4.198	0.999
R14	R14	01/08/2025	y = 1.109x-2.662	0.998
R15	R15	01/08/2025	y = 1.126x-5.806	0.996
R16	R16	01/08/2025	y = 1.149x-7.086	0.996
R17	R17	01/08/2025	y = 1.120x-5.050	0.997
R18	R18	04/08/2025	y = 1.155x-5.737	0.997
R19	R19	04/08/2025	y = 1.131x-5.715	0.997
R20	R20	01/08/2025	y = 1.152x-5.912	0.996

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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	R^2
B01	SKC	224-PCXR4	262101	03/10/2025	1,000	1,500	2,000	998	1,490	1,997	1.000x - 7.191	1.000
B02	SKC	224-PCXR4	626166	03/10/2025	1,000	1,500	2,000	1,007	1,500	2,008	0.999x + 2.537	1.000
B03	SKC	224-PCXR4	612968	03/10/2025	1,000	1,500	2,000	1,003	1,503	2,001	0.997x + 0.810	0.999
B04	SKC	224-PCXR4	602804	02/10/2025	1,000	1,500	2,000	998	1,494	1,993	1.001x - 6.035	1.000
B05	SKC	224-PCXR4	612693	02/10/2025	1,000	1,500	2,000	999	1,495	2,001	0.999x - 2.481	1.000
B06	SKC	224-PCXR4	262188	02/10/2025	1,000	1,500	2,000	997	1,510	2,000	0.998x + 0.064	0.999
B07	SKC	224-PCXR4	626262	01/10/2025	1,000	1,500	2,000	1,004	1,492	2,007	1.002x - 4.778	1.000
B08	SKC	224-PCXR4	626100	02/10/2025	1,000	1,500	2,000	1,005	1,500	2,005	1.004x - 7.223	1.000
B09	SKC	224-PCXR4	626479	01/10/2025	1,000	1,500	2,000	1,001	1,501	1,986	0.996x + 3.462	0.999
B10	SKC	224-PCXR4	091950	01/10/2025	1,000	1,500	2,000	997	1,504	2,000	1.003x - 8.822	1.000
B11	SKC	224-PCXR8	564315	03/10/2025	1,000	1,500	2,000	1,001	1,503	1,995	0.995x + 2.449	1.000
B12	SKC	224-PCXR4	034656	03/10/2025	1,000	1,500	2,000	997	1,506	2,003	1.003x - 9.062	0.999
B13	SKC	224-PCXR4	602073	03/10/2025	1,000	1,500	2,000	1,003	1,497	2,006	1.002x - 5.013	1.000
B14	SKC	224-PCXR4	626313	03/10/2025	1,000	1,500	2,000	998	1,501	1,992	1.005x - 11.702	0.999
B15	SKC	224-PCXR4	626474	03/10/2025	1,000	1,500	2,000	1,001	1,502	2,004	1.006x - 11.694	1.000
B16	SKC	224-PCXR4	626477	03/10/2025	1,000	1,500	2,000	996	1,498	1,992	1.007x - 16.329	0.999
B17	SKC	224-PCXR4	626860	02/10/2025	1,000	1,500	2,000	1,001	1,503	1,998	1.001x - 4.838	1.000
B18	SKC	224-PCXR4	691484	01/10/2025	1,000	1,500	2,000	997	1,514	1,996	0.996x + 5.360	1.000
B19	SKC	224-PCXR4	691599	01/10/2025	1,000	1,500	2,000	998	1,499	2,003	0.998x + 0.399	1.000
B20	SKC	224-PCXR4	691587	01/10/2025	1,000	1,500	2,000	1,001	1,501	1,999	0.995x + 1.520	0.999
B21	SKC	224-PCXR4	691531	03/10/2025	1,000	1,500	2,000	996	1,502	2,001	1.003x - 7.151	1.000
B22	SKC	224-PCXR4	691654	03/10/2025	1,000	1,500	2,000	1,001	1,500	1,998	0.997x - 0.666	1.000
B23	SKC	224-PCXR4	798393	03/10/2025	1,000	1,500	2,000	993	1,507	1,999	1.007x - 17.505	0.999
B24	SKC	224-PCXR4	626363	03/10/2025	1,000	1,500	2,000	994	1,498	1,995	1.000x - 3.941	1.000
B25	SKC	224-PCXR4	798489	01/10/2025	1,000	1,500	2,000	1,003	1,490	2,001	0.997x + 1.703	1.000
B26	SKC	224-PCXR4	798479	01/10/2025	1,000	1,500	2,000	1,001	1,509	1,995	1.002x - 8.057	0.999
B27	SKC	224-PCXR4	691673	01/10/2025	1,000	1,500	2,000	998	1,510	2,002	1.005x - 9.656	1.000
B28	SKC	224-PCXR4	691570	01/10/2025	1,000	1,500	2,000	1,011	1,508	2,009	0.999x + 3.729	0.999
B29	SKC	224-PCXR4	626472	01/10/2025	1,000	1,500	2,000	1,002	1,503	1,998	1.002x - 6.066	1.000
B30	SKC	224-PCXR4	691489	01/10/2025	1,000	1,500	2,000	997	1,506	2,001	1.004x - 8.049	1.000
B31	SKC	224-PCXR4	691509	02/10/2025	1,000	1,500	2,000	995	1,497	1,992	0.998x - 2.293	1.000
B32	SKC	224-PCXR4	091567	01/10/2025	1,000	1,500	2,000	1,002	1,500	2,003	1.008x - 15.778	0.999
B33	SKC	224-PCXR4	091756	02/10/2025	1,000	1,500	2,000	1,003	1,501	1,997	1.003x - 6.509	1.000
B34	SKC	224-PCXR4	612962	01/10/2025	1,000	1,500	2,000	996	1,512	1,996	1.001x - 5.867	0.999
B35	SKC	224-PCXR4	602882	01/10/2025	1,000	1,500	2,000	1,008	1,494	1,999	0.993x + 6.992	1.000
B36	SKC	224-PCXR4	626164	01/10/2025	1,000	1,500	2,000	997	1,502	1,992	0.999x - 3.235	1.000
B37	SKC	224-PCXR4	626256	01/10/2025	1,000	1,500	2,000	1,003	1,490	1,997	0.994x + 5.095	1.000
B38	SKC	224-PCXR4	626167	02/10/2025	1,000	1,500	2,000	998	1,513	1,995	1.000x - 5.277	0.999
B39	SKC	224-PCXR4	034637	03/10/2025	1,000	1,500	2,000	1,007	1,504	2,004	0.996x + 8.240	1.000
B40	SKC	224-PCXR4	798349	03/10/2025	1,000	1,500	2,000	998	1,510	2,002	0.998x + 3.905	1.000

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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	R^2
B41	SKC	224-PCXR4	612669	01/10/2025	1,000	1,500	2,000	1,010	1,508	2,009	1.000x + 2.612	0.999
B42	SKC	224-PCXR4	626041	02/10/2025	1,000	1,500	2,000	1,004	1,494	1,994	0.997x + 1.344	1.000
B43	SKC	224-PCXR4	034636	01/10/2025	1,000	1,500	2,000	998	1,505	2,002	1.001x - 5.177	1.000
B44	SKC	224-PCXR8	529341	01/10/2025	1,000	1,500	2,000	999	1,496	1,998	0.996x + 0.909	1.000
B45	SKC	224-PCXR8	529594	01/10/2025	1,000	1,500	2,000	996	1,510	1,992	1.005x - 11.543	1.000
B46	SKC	224-PCXR8	566743	01/10/2025	1,000	1,500	2,000	1,003	1,488	1,997	0.994x + 3.717	1.000
B47	SKC	224-PCXR8	566747	01/10/2025	1,000	1,500	2,000	1,004	1,500	1,993	0.996x + 2.230	1.000
B48	SKC	224-PCXR8	566753	01/10/2025	1,000	1,500	2,000	1,002	1,501	1,991	1.000x - 4.116	0.999
B49	SKC	224-PCXR8	566780	01/10/2025	1,000	1,500	2,000	995	1,502	1,990	0.997x - 1.978	1.000
B50	SKC	224-PCXR8	500400	02/10/2025	1,000	1,500	2,000	997	1,503	2,001	1.004x - 10.178	1.000
B51	SKC	224-PCXR8	500363	01/10/2025	1,000	1,500	2,000	1,001	1,502	1,993	0.995x + 2.848	1.000
B52	SKC	224-PCXR8	093186	03/10/2025	1,000	1,500	2,000	996	1,510	1,999	1.005x - 12.252	0.999
B53	SKC	224-PCXR8	707670	03/10/2025	1,000	1,500	2,000	1,002	1,496	2,004	1.003x - 8.791	1.000
B54	SKC	224-PCXR3	509821	03/10/2025	1,000	1,500	2,000	999	1,501	1,995	0.999x - 2.090	1.000
B55	SKC	224-PCXR3	510710	02/10/2025	1,000	1,500	2,000	1,002	1,503	2,006	1.007x - 13.250	0.999
B56	SKC	224-PCXR3	511450	01/10/2025	1,000	1,500	2,000	995	1,505	1,997	1.002x - 7.594	1.000
B57	SKC	224-PCXR3	510798	02/10/2025	1,000	1,500	2,000	998	1,500	1,994	0.999x - 7.163	0.999
B58	SKC	224-PCXR3	509852	03/10/2025	1,000	1,500	2,000	1,002	1,494	1,996	0.993x + 6.485	1.000
B59	SKC	224-PCXR3	509862	01/10/2025	1,000	1,500	2,000	1,006	1,505	1,998	0.996x + 5.117	1.000
B60	SKC	224-PCXR3	512655	02/10/2025	1,000	1,500	2,000	1,004	1,501	2,003	1.010x - 14.223	0.999
B61	SKC	224-PCXR3	503915	03/10/2025	1,000	1,500	2,000	993	1,495	1,994	0.999x - 4.942	1.000
B62	SKC	224-PCXR3	505975	03/10/2025	1,000	1,500	2,000	995	1,500	2,005	1.009x - 16.396	1.000
B63	SKC	224-PCXR3	511432	03/10/2025	1,000	1,500	2,000	996	1,497	1,991	0.998x - 3.171	1.000
B64	SKC	224-PCXR3	508502	03/10/2025	1,000	1,500	2,000	1,008	1,506	1,998	0.992x + 8.667	0.999
B65	SKC	224-PCXR3	508310	03/10/2025	1,000	1,500	2,000	1,006	1,492	2,003	1.000x - 4.355	1.000
B66	SKC	224-PCXR3	509861	03/10/2025	1,000	1,500	2,000	994	1,496	1,994	0.997x - 0.275	1.000
B67	SKC	224-PCXR3	506295	01/10/2025	1,000	1,500	2,000	997	1,505	2,001	1.004x - 10.258	1.000
B68	SKC	224-PCXR3	505872	03/10/2025	1,000	1,500	2,000	998	1,512	1,992	0.999x - 3.554	0.999
B69	SKC	224-PCXR3	508375	01/10/2025	1,000	1,500	2,000	997	1,489	1,996	0.997x - 2.309	1.000
B70	SKC	224-PCXR3	510623	03/10/2025	1,000	1,500	2,000	1,001	1,496	1,991	0.992x + 7.131	1.000
B71	SKC	224-PCXR3	508367	03/10/2025	1,000	1,500	2,000	999	1,498	1,995	0.998x + 6.433	1.000
B72	SKC	224-PCXR3	505977	03/10/2025	1,000	1,500	2,000	996	1,507	1,999	1.003x - 7.490	1.000
B73	SKC	224-PCXR3	512606	03/10/2025	1,000	1,500	2,000	1,004	1,503	2,003	1.001x - 5.285	0.999
B74	SKC	224-PCXR3	505993	01/10/2025	1,000	1,500	2,000	1,006	1,501	1,997	0.993x + 8.232	1.000
B75	SKC	224-PCXR3	509820	02/10/2025	1,000	1,500	2,000	1,005	1,494	1,995	0.997x - 2.979	0.999
B76	SKC	224-PCXR3	509811	02/10/2025	1,000	1,500	2,000	996	1,503	1,999	1.005x - 10.613	1.000
B77	SKC	224-PCXR3	508301	01/10/2025	1,000	1,500	2,000	1,003	1,490	1,998	0.994x + 4.694	1.000
B78	SKC	224-PCXR3	510677	01/10/2025	1,000	1,500	2,000	1,004	1,492	1,997	0.995x + 4.036	1.000
B79	SKC	224-PCXR3	510920	01/10/2025	1,000	1,500	2,000	1,008	1,504	2,006	1.006x - 9.588	0.999

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Approved by : (Mr. Peera Detudom)

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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	R^2
B80	SKC	224-PCXR3	504569	01/10/2025	1,000	1,500	2,000	1,004	1,510	2,004	0.999x - 0.786	0.999
B81	SKC	224-PCXR3	503480	01/10/2025	1,000	1,500	2,000	1,004	1,509	2,002	1.000x - 1.340	0.999
B82	SKC	224-PCXR3	505673	01/10/2025	1,000	1,500	2,000	1,007	1,502	2,003	0.994x+ 9.425	1.000
B83	SKC	224-PCXR3	510785	01/10/2025	1,000	1,500	2,000	997	1,494	1,994	0.999x - 1.727	0.999
B84	SKC	224-PCXR3	508333	01/10/2025	1,000	1,500	2,000	1,000	1,505	2,005	1.002x - 5.217	1.000
B85	SKC	224-PCXR3	505757	03/10/2025	1,000	1,500	2,000	996	1,507	1,998	1.001x - 4.459	1.000
B86	SKC	224-PCXR3	512625	03/10/2025	1,000	1,500	2,000	998	1,506	1,993	0.997x - 4.180	0.999
B87	SKC	224-PCXR3	504324	03/10/2025	1,000	1,500	2,000	1,003	1,510	2,004	1.000x + 1.037	1.000
B88	SKC	224-PCXR3	508307	03/10/2025	1,000	1,500	2,000	995	1,505	1,999	1.007x - 17.485	0.999
B89	SKC	224-PCXR3	509860	03/10/2025	1,000	1,500	2,000	999	1,500	2,001	1.002x - 6.218	1.000
B90	SKC	224-PCXR3	508366	02/11/2025	1,000	1,500	2,000	996	1,505	2,004	1.008x - 15.379	1.000
B91	SKC	224-PCXR3	510919	01/10/2025	1,000	1,500	2,000	1,004	1,504	2,003	0.998x + 1.328	1.000
B92	SKC	224-PCXR3	510987	03/10/2025	1,000	1,500	2,000	997	1,505	2,003	1.009x - 17.601	0.999
B93	SKC	224-PCXR3	509845	03/10/2025	1,000	1,500	2,000	1,006	1,511	2,001	0.998x + 2.138	0.999

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Approved by : (Mr. Peera Detudom)

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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 : 136833

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	R^2
R01	SKC	224-PCXR4	602467	01/10/2025	1,000	1,500	2,000	1,001	1,504	2,006	1.001x + 1.123	1.000
R02	SKC	224-PCXR4	626450	01/10/2025	1,000	2,000	3,000	997	1,511	1,997	1.000x - 2.215	1.000
R03	SKC	224-PCXR4	691592	01/10/2025	1,000	1,500	2,000	1,004	1,504	2,008	1.005x - 3.705	1.000
R04	SKC	224-PCXR4	691672	01/10/2025	1,000	1,500	2,000	1,013	1,505	2,007	0.996x + 7.748	0.999
R05	SKC	224-PCXR4	798470	01/10/2025	1,000	1,500	2,000	1,005	1,506	2,010	1.007x - 4.757	1.000
R06	SKC	224-PCXR4	798456	01/10/2025	1,000	1,500	2,000	996	1,503	1,999	1.003x - 5.913	1.000
R07	SKC	224-PCXR4	798480	03/10/2025	1,000	1,500	2,000	997	1,502	1,996	1.000x - 8.975	0.999
R08	SKC	224-PCXR4	883215	03/10/2025	1,000	1,500	2,000	1,005	1,504	1,995	0.999x - 0.068	1.000
R09	SKC	224-PCXR4	039650	03/10/2025	1,000	1,500	2,000	994	1,505	1,998	1.005x - 11.989	1.000
R10	SKC	224-PCXR4	091765	01/10/2025	1,000	1,500	2,000	1,005	1,508	2,006	1.008x - 11.738	0.999
R11	SKC	224-PCXR4	091763	01/10/2025	1,000	1,500	2,000	1,006	1,493	2,003	0.996x + 5.589	1.000
R12	SKC	224-PCXR4	091568	02/10/2025	1,000	1,500	2,000	995	1,496	1,999	1.002x - 5.717	1.000
R13	SKC	224-PCXR4	091638	01/10/2025	1,000	1,500	2,000	1,012	1,505	2,008	1.004x - 2.938	0.999
R14	SKC	224-PCXR4	091764	01/10/2025	1,000	1,500	2,000	996	1,494	2,004	1.008x - 18.690	1.000
R15	SKC	224-PCXR8	529457	01/10/2025	1,000	1,500	2,000	998	1,507	2,007	1.007x - 12.957	0.999
R16	SKC	224-PCXR8	529643	01/10/2025	1,000	1,500	2,000	997	1,496	1,994	0.999x - 1.395	1.000
R17	SKC	224-PCXR8	529645	01/10/2025	1,000	1,500	2,000	1,005	1,503	1,995	1.005x - 10.886	0.999
R18	SKC	224-PCXR8	566756	01/10/2025	1,000	1,500	2,000	997	1,505	1,993	1.000x - 4.450	1.000
R19	SKC	224-PCXR8	566802	01/10/2025	1,000	1,500	2,000	1,004	1,504	2,007	1.006x - 6.752	1.000
R20	SKC	224-PCXR8	529089	03/10/2025	1,000	1,500	2,000	1,008	1,497	2,001	1.002x - 6.225	0.999
R21	SKC	224-PCXR8	665728	03/10/2025	1,000	1,500	2,000	997	1,505	2,003	1.006x - 16.975	0.999
R22	SKC	224-PCXR8	707444	01/10/2025	1,000	1,500	2,000	1,005	1,494	2,001	0.995x + 6.369	1.000
R23	SKC	224-PCXR8	761067	01/10/2025	1,000	1,500	2,000	1,008	1,495	2,000	0.992x + 13.025	1.000
R24	SKC	224-PCXR8	707893	01/10/2025	1,000	1,500	2,000	1,005	1,504	1,997	1.004x - 8.140	0.999
R25	SKC	224-PCXR8	761052	01/10/2025	1,000	1,500	2,000	1,006	1,510	2,006	1.001x - 0.152	0.999
R26	SKC	224-PCXR8	707956	01/10/2025	1,000	1,500	2,000	1,000	1,513	2,008	1.008x - 10.714	1.000
R27	SKC	224-PCXR8	707398	02/10/2025	1,000	1,500	2,000	1,011	1,512	2,012	1.002x + 2.547	0.999
R28	SKC	224-PCXR8	707481	02/10/2025	1,000	1,500	2,000	999	1,498	2,000	1.000x + 0.144	1.000
R29	SKC	224-PCXR8	707402	02/10/2025	1,000	1,500	2,000	1,000	1,509	2,006	1.004x - 5.501	1.000
R30	SKC	224-PCXR8	093811	02/10/2025	1,000	1,500	2,000	998	1,514	2,005	1.009x - 10.222	1.000
R31	SKC	224-PCXR8	093183	01/10/2025	1,000	1,500	2,000	999	1,508	2,003	1.005x - 9.587	1.000
R32	SKC	224-PCXR8	671950	01/10/2025	1,000	1,500	2,000	1,000	1,494	1,996	0.994x + 5.137	1.000
R33	SKC	224-PCXR4	626254	01/10/2025	1,000	1,500	2,000	1,004	1,493	2,005	1.008x - 16.151	0.999
R34	SKC	224-PCXR4	626131	01/10/2025	1,000	1,500	2,000	998	1,508	1,994	0.998x - 0.764	1.000
R35	SKC	224-PCXR8	707460	01/10/2025	1,000	1,500	2,000	1,003	1,502	1,993	0.993x + 8.172	1.000
R36	SKC	224-PCXR8	707446	01/10/2025	1,000	1,500	2,000	997	1,510	1,999	1.004x - 8.044	1.000
R37	SKC	224-PCXR8	707432	01/10/2025	1,000	1,500	2,000	1,012	1,515	2,007	0.997x + 7.376	0.999
R38	SKC	224-PCXR8	707349	03/10/2025	1,000	1,500	2,000	999	1,511	1,998	1.001x - 2.918	1.000
R39	SKC	224-PCXR8	761095	03/10/2025	1,000	1,500	2,000	1,008	1,514	1,996	0.993x + 11.058	0.999

Calibrated by : Adul Dangklom (Mr. Adul Dangklom)

Approved by : (Mr. Peera Detudom)

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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

Calibration Data

Rotameter Data			Calibration Data							
				Flow Rate (ml/min)						Value From Calibration Curve	
				Flow Rate (Reading)			Actual (Q std.)				
No.	Brand	Model	Date	1	2	3	1	2	3	y	R^2
L-B01	Dwyer	VFA-21	01/10/2025	50	100	200	50.7	99.8	199.6	1.000x + 0.067	1.000
L-B02	Dwyer	VFA-21	01/10/2025	50	100	200	50.2	99.4	198.7	1.001x - 1.181	0.999
L-B03	Dwyer	VFA-21	01/10/2025	50	100	200	50.8	99.2	201.5	1.002x + 0.053	1.000
L-B04	Dwyer	VFA-21	01/10/2025	50	100	200	49.7	101.6	200.8	1.001x + 0.344	1.000
L-B05	Dwyer	VFA-21	01/10/2025	50	100	200	50.5	100.4	201.6	0.998x + 0.225	0.999
L-B06	Dwyer	VFA-21	01/10/2025	50	100	200	50.1	100.5	201.8	1.003x - 0.103	1.000
L-B07	Dwyer	VFA-21	02/10/2025	50	100	200	50.6	100.8	201.3	0.998x + 0.877	1.000
L-B08	Dwyer	VFA-21	01/10/2025	50	100	200	49.8	101.3	198.9	1.000x - 0.165	1.000
L-B09	Dwyer	VFA-21	02/10/2025	50	100	200	50.1	99.6	200.7	1.002x - 0.766	0.999
L-B10	Dwyer	VFA-21	03/10/2025	50	100	200	50.9	100.8	201.2	1.003x + 0.694	1.000

Calibrated by : Adul Dangklom (Mr.Adul Dangklom)

Approved by : (Mr. Peera Detudom)

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CALIBRATION REPORT

CHEMILUMINESCENT NO / NO_2 / NO_X ANALYZER

DATE : 02 November 2025 BRAND : API MODEL : 200A

NO. NOX-B01 SERIAL NO. 2368

Calibrator (Dilution System)

Brand	: Teledyne	Model	: 700
Last Cal. Date	: 24 October 2025	Serial No.	: 421

Reference Standard Gas

Standard Gas	: Nitric Oxide (NO)			Cylinder No.	: A00726SV
Certified Date	: 05 January 2023	Expired Date	: 05 January 2026	Cylinder Conc.	: 48.8 ppm

CALIBRATING CONDITION

Pressure 1011 mmbar Temp. 24.5 °C % RH 50

CALIBRATION SETTING

Span Set Point	Initial Reading (Before Adj.),PPB			Final Reading (After Adj.),PPB	
	Expected Concentration	Analyzer Response	%Dif	Analyzer Response	Slope
Zero	0	0.10	-	0	-
NO Span	400	399.8	-0.050	400.0	1.008
NO_X Span	400	400.1	0.025	400.0	1.011

API Model 200A NO_X 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	503	cc/min	500 ± 50
OZONE FLOW	78	cc/min	80 ± 15
PMT	103.1	mV	-20 - 150
AZERO	93.8	mV	-20 - 150
HVPS	670	V	420 - 900 constant
RCELL TEMP	50.3	°C	50 ± 1
BOX TEMP	29.4	°C	8 - 48
PMT TEMP	7.2	°C	7 ± 2
MOLY TEMP	314.9	°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_X Span Conc	400	PPB	20 - 20,000
NO Slope	1.008	-	1.0 ± 0.3
NO_X Slope	1.011	-	1.0 ± 0.3
NO Offset	1.5	mV	-20 to +150
NO_X 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

Calibrated by : Adul Dangklom (Mr.Adul Dangklom)

Approved by : (Mr.Peera Detudom)

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CALIBRATION REPORT

CHEMILUMINESCENT NO / NO_2 / NO_x ANALYZER

DATE :	02 November 2025	BRAND :	API	MODEL :	200A
NO.	NOX-B03			SERIAL NO.	2617

Calibrator (Dilution System)

Brand	: Teledyne	Model	: 700
Last Cal. Date	: 24 October 2025	Serial No.	: 421

Reference Standard Gas

Standard Gas	: Nitric Oxide (NO)			Cylinder No.	: A00726SV
Certified Date	: 05 January 2023	Expired Date	: 05 January 2026	Cylinder Conc.	: 48.8 ppm

CALIBRATING CONDITION

Pressure	1011 mmbar	Temp.	24.5 °C	% RH	50

CALIBRATION SETTING

Span Set Point	Initial Reading (Before Adj.),PPB			Final Reading (After Adj.),PPB	
	Expected Concentration	Analyzer Response	%Dif	Analyzer Response	Slope
Zero	0	-0.10	-	0	-
NO Span	400	399.6	-0.100	400.0	1.004
NO_x Span	400	399.8	-0.050	400.0	1.007

API Model 200A NO_x 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	506	cc/min	500 ± 50
OZONE FLOW	78	cc/min	80 ± 15
PMT	103.2	mV	-20 - 150
AZERO	94.0	mV	-20 - 150
HVPS	674	V	420 - 900 constant
RCELL TEMP	50.1	°C	50 ± 1
BOX TEMP	29.2	°C	8 - 48
PMT TEMP	7.3	°C	7 ± 2
MOLY TEMP	314.8	°C	315 ± 5
RCELL PRESS	8.3	IN-Hg-A	2 - 10 constant
SAMPLE PRESS	28.5	IN-Hg-A	25 - 30 constant
NO Span Conc	400	PPB	20 - 20,000
NO_x Span Conc	400	PPB	20 - 20,000
NO Slope	1.004	-	1.0 ± 0.3
NO_x Slope	1.007	-	1.0 ± 0.3
NO Offset	1.0	mV	-20 to +150
NO_x Offset	0.6	mV	-20 to 150
Stability at Zero	0.1	PPB	< 0.2
Stability at Span	0.2	PPB	< 2 ppb @ 400 ppb span gas

Calibrated by : Adul Dangklom
(Mr.Adul Dangklom)

Approved by :
(Mr.Peera Detudom)

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CALIBRATION REPORT

CHEMILUMINESCENT NO / NO_2 / NO_x ANALYZER

DATE :	02 November 2025	BRAND :	API	MODEL :	200E
NO.	NOX-B10			SERIAL NO.	4465

Calibrator (Dilution System)

Brand	: Teledyne	Model	: 700
Last Cal. Date	: 24 October 2025	Serial No.	: 421

Reference Standard Gas

Standard Gas	: Nitric Oxide (NO)			Cylinder No.	: A00726SV
Certified Date	: 05 January 2023	Expired Date	: 05 January 2026	Cylinder Conc.	: 48.8 ppm

CALIBRATING CONDITION

Pressure	1011 mmbar	Temp.	24.5 °C	% RH	50

CALIBRATION SETTING

Span Set Point	Initial Reading (Before Adj.),PPB			Final Reading (After Adj.),PPB	
	Expected Concentration	Analyzer Response	%Dif	Analyzer Response	Slope
Zero	0	0.11	-	0	-
NO Span	400	400.1	0.025	400.0	1.010
NO_x Span	400	400.2	0.050	400.0	1.013

API Model 200E NO_x 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	675	V	420 - 900 constant
RCELL TEMP	50.2	°C	50 ± 1
BOX TEMP	29.1	°C	8 - 48
PMT TEMP	7.0	°C	7 ± 2
MOLY TEMP	315.4	°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_x Span Conc	400	PPB	20 - 20,000
NO Slope	1.010	-	1.0 ± 0.3
NO_x Slope	1.013	-	1.0 ± 0.3
NO Offset	1.6	mV	-20 to +150
NO_x Offset	1.0	mV	-20 to 150
Stability at Zero	0.1	PPB	< 0.2
Stability at Span	0.2	PPB	< 2 ppb @ 400 ppb span gas

Calibrated by : Adul Dangklom
(Mr.Adul Dangklom)

Approved by :
(Mr.Peera Detudom)

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CALIBRATION REPORT

CHEMILUMINESCENT NO / NO_2 / NO_x ANALYZER

DATE :	02 November 2025	BRAND :	API	MODEL :	200A
NO.	NOX-B15			SERIAL NO.	213

Calibrator (Dilution System)

Brand	: Teledyne	Model	: 700
Last Cal. Date	: 24 October 2025	Serial No.	: 421

Reference Standard Gas

Standard Gas	: Nitric Oxide (NO)			Cylinder No.	: A00726SV
Certified Date	: 05 January 2023	Expired Date	: 05 January 2026	Cylinder Conc.	: 48.8 ppm

CALIBRATING CONDITION

Pressure	1011	mmbar	Temp.	24.5 °C	% RH 50

CALIBRATION SETTING

Span Set Point	Initial Reading (Before Adj.),PPB			Final Reading (After Adj.),PPB	
	Expected Concentration	Analyzer Response	%Dif	Analyzer Response	Slope
Zero	0	-0.10	-	0	-
NO Span	400	399.7	-0.075	400.0	1.005
NO_x Span	400	399.9	-0.025	400.0	1.008

API Model 200A NO_x 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	504	cc/min	500 ± 50
OZONE FLOW	78	cc/min	80 ± 15
PMT	103.0	mV	-20 - 150
AZERO	93.7	mV	-20 - 150
HVPS	669	V	420 - 900 constant
RCELL TEMP	50.0	°C	50 ± 1
BOX TEMP	28.9	°C	8 - 48
PMT TEMP	7.1	°C	7 ± 2
MOLY TEMP	315.3	°C	315 ± 5
RCELL PRESS	8.5	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_x Span Conc	400	PPB	20 - 20,000
NO Slope	1.005	-	1.0 ± 0.3
NO_x Slope	1.008	-	1.0 ± 0.3
NO Offset	1.1	mV	-20 to +150
NO_x 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

Calibrated by : Adul Dangklom
(Mr.Adul Dangklom)

Approved by :
(Mr.Peera Detudom)

QUALITY CALIBRATION CO.,LTD.
235 Petchkasem 63/2 Road, Laksong, Bangkae, Bangkok 10160
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www.qcalibration.com

ilac-MRA
NSC-TISI-TISI 17025 CALIBRATION 0049

CERTIFICATE No : 25M2254
REFERENCE No : 76365-1

Certificate of Calibration

EQUIPMENT	:	DIGITAL BALANCE
MANUFACTURER	:	METTLER TOLEDO
MODEL	:	XS105DU
SERIAL No	:	1126422905
ID No	:	BA05/50
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	:	07-Mar-25
APPROVED BY	:	PONGSAK J.
ISSUED DATE	:	13-Mar-25
RECEIVED DATE	:	07-Mar-25

Certificate

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

F-G010 REV 03

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CERTIFICATE No : 25M2254

Calibration Report

EQUIPMENT	:	DIGITAL BALANCE	**MODEL**	:	XS105DU
MANUFACTURER	:	METTLER TOLEDO	**S/N**	:	1126422905
ID No	:	BA05/50	**RECEIVED DATE**	:	07-Mar-25
AIR PRESSURE	:	1009mbar ± 1mbar	**CALIBRATION DATE**	:	07-Mar-25
AMBIENT TEMPERATURE	:	24° C ± 1° C	**RELATIVE HUMIDITY**	:	54 %RH ± 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 NOT ADJUSTED BEFORE CALIBRATION. 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 LINEARLITY 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	C02250116	28-Jan-27
2) STANDARD WEIGHT	E2	15843	C02250117	29-Jan-27

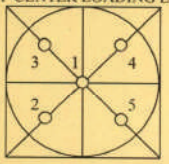
3. THE CERTIFICATE IS VALID FOR THE ITEM CALIBRATED AS SHOWN ON THE DATE AND PLACE OF CALIBRATION ONLY.
4. THIS RESULT EXCLUDE LONG TERM STABILITY OF THE UNIT UNDER CALIBRATION.
5. THIS CERTIFICATE IS TRACEABLE TO THE INTERNATIONAL SYSTEM OF UNIT MAINTAINED AT:-
   - NATIONAL INSTITUTE OF METROLOGY (THAILAND)

RESULT OF CALIBRATION :- WITHOUT ADJUSTMENT

1. ZERO SETTING FUNCTION : NORMAL
2. TARE FUNCTION : NORMAL
3. REPEATABILITY OF READING AT 120 g WAS 0.000055 g
4. DEPARTURE FROM NOMINAL VALUE/ LINEARITY

NOMINAL VALUE (g)	BALANCE READING (g)	CORRECTION (g)	UNCERTAINTY (± g)
0.00	0.00000	0.00000	0.000065
0.02	0.01999	0.00001	0.000065
0.10	0.10001	-0.00001	0.000066
0.20	0.20001	-0.00001	0.000066
0.50	0.50002	-0.00002	0.000065
1.00	1.00003	-0.00003	0.000066
2.00	2.00001	-0.00001	0.000067
5.00	5.00002	-0.00002	0.000068
10.00	10.00000	0.00000	0.000070
20.00	20.00004	-0.00004	0.000078
50.00	50.0000	0.0000	0.00013
100.00	100.0001	-0.0001	0.00019
120.00	120.0002	-0.0002	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

Copy

SITHIPORN ASSOCIATES CO., LTD.
CALIBRATION LABORATORY
451-451/1 Sirinthorn Road, Bangbumru, Bangplud, Bangkok, 10700 Thailand
Tel. +66 2433 8331 Email : calibration@sithiphorn.com

SITHIPORN associates

ilac-MRA

NSC-TISI-TIS 17025 CALIBRATION 0394

Cert. No. : SP25026
Pages : 1 of 4

Calibration Certificate

Equipment :	UV-VIS SPECTROPHOTOMETER
Manufacturer :	PERKINELMER
Model :	LAMBDA 25
Serial No.:	501S14123010
ID No.:	SP03/58
Calibration Mode :	WAVELENGTH ACCURACY PHOTOMETRIC ACCURACY STRAY LIGHT
Condition As Found :	GOOD
Customer :	S.P.S CONSULTING SERVICE CO., LTD. 7 SOI PHAHOLYOTHIN 24, PHAHOLYOTHIN ROAD, CHOMPHON SUB-DISTRICT, CHATUCHAK DISTRICT, BANGKOK PROVINCE 10900 THAILAND.
Location :	ORGANIC LABORATORY IV
Ambient Temperature :	(22.9 ± 5) °C
Relative Humidity :	(53.7 ± 25) %
Received Date :	22 AUGUST 2025
Calibration Date :	22 AUGUST 2025
Date of Issue :	25 AUGUST 2025

Calibrated by : Nitinun Srihawan

Approved by : Wichok B.
(Wichok Ekpongpradit)

This certificate is issued in accordance with the requirements of ISO/IEC 17025 standard, may not be reproduced other than in full, except with the prior written approval of the head of Calibration Laboratory.

Cert. No. : SP25026
Job No. : VC68SP0019
Pages : 2 of 4

Calibration Method :

This instrument was calibrated by using on-site calibration procedure In-house method : CP-SP-01
The calibration procedure to direct measurement wavelength accuracy by using wavelength standard solution, Photometric accuracy by using absorbance standard filter and absorbance standard solution
The calibration procedure used was based on ASTM E275-01,ASTM E925-02

Condition of this result of calibration :

1. Certified reference materials

Material	Ref. type	Cell serial No.	Cert. No.	Due Date
Holmium liquid	RM-HL	29706	126461	24/10/2026
Didymium liquid	RM-DL	28912	126462	24/10/2026
Neutral density filter	RM-1N2N3N	13877	126457	24/10/2026
Potassium dichromate solutions	RM-0204060810	14204	126497	25/10/2026
Potassium Iodide solution	-	KI-0701-001	CI-0185-24	14/05/2026

2. This result of calibration was found accurate as shown on date and place of calibration only.
3. This certificate is traceable to the international system of unit maintained at :
   3.1 The UK National Physical Laboratory (NPL)

Result of calibration : Wavelength Accuracy

(Without adjustment)

Material	Certified Values of Reference Material (nm)	UUC* Reading (nm)	Error (nm)	Uncertainty ± (nm)	*k* Factor
RM-HL	278.13	278.21	0.08	0.16	2.00
	361.25	361.39	0.14	0.16	2.00
	467.82	467.71	-0.11	0.16	2.00
	536.56	536.50	-0.06	0.16	2.00
	640.50	640.36	-0.14	0.16	2.00
RM-DL	740.09	739.85	-0.24	0.16	2.00
	864.94	865.12	0.18	0.16	2.00

UUC* = Unit Under Calibration

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CALIBRATION LABORATORY

Cert. No. : SP25026
Job No. : VC68SP0019
Pages : 3 of 4

Result of calibration : Photometric Accuracy

Material	Wavelength (nm)	Filter S/N	Nominal Absorbance (A)	Certified Absorbance (A)	UUC* Reading Absorbance (A)	Error (A)	Uncertainty ± (A)	*k* Factor
Neutral Density glass filter	440.0	29381	0.5	0.5443	0.5413	-0.0030	0.0043	2.00
		29914	0.7	0.7484	0.7455	-0.0029	0.0054	2.00
		29360	1.0	1.0527	1.0535	0.0008	0.0032	2.00
	465.0	29381	0.5	0.4948	0.4922	-0.0026	0.0041	2.00
		29914	0.7	0.6906	0.6877	-0.0029	0.0050	2.00
		29360	1.0	0.9695	0.9709	0.0014	0.0031	2.00
	546.1	29381	0.5	0.5090	0.5068	-0.0022	0.0036	2.00
		29914	0.7	0.6985	0.6960	-0.0025	0.0041	2.00
		29360	1.0	0.9814	0.9825	0.0011	0.0031	2.00
	590.0	29381	0.5	0.5375	0.5353	-0.0022	0.0034	2.00
		29914	0.7	0.7256	0.7231	-0.0025	0.0037	2.00
		29360	1.0	1.0213	1.0219	0.0006	0.0032	2.00
	635.0	29381	0.5	0.5223	0.5202	-0.0021	0.0033	2.00
		29914	0.7	0.6927	0.6901	-0.0026	0.0036	2.00
		29360	1.0	0.9744	0.9750	0.0006	0.0032	2.00

UUC* = Unit Under Calibration

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CALIBRATION LABORATORY

Cert. No. : SP25026
Job No. : VC68SP0019
Pages : 4 of 4

Result of calibration : Photometric Accuracy

(Without adjustment)

Material	Wavelength (nm)	Solution (mg/l)	Certified Absorbance (A)	UUC* Reading Absorbance (A)	Error (A)	Uncertainty ± (A)	*k* Factor
Potassium dichromate solutions	235.0	20	0.2415	0.2443	0.0028	0.0101	2.00
		40	0.4866	0.4871	0.0005	0.0115	2.00
		60	0.7415	0.7295	-0.0120	0.0067	2.00
		80	0.9854	0.9844	-0.0010	0.0071	2.00
		100	1.2444	1.2425	-0.0019	0.0073	2.00

UUC* = Unit Under Calibration

Condition of this result of calibration : Spectrophotometer PERKINELMER Model LAMBDA 25 S/N 501S14123010

Resolution of Wavelength Mode	0.1 nm
Resolution of Photometric Mode	0.001 A
Parameter Setting	
Measurement Mode	Wavelength, Absorbance
Wavelength Scan	190 nm - 1100 nm
Scanning Speed	7.5 nm/min
Band width(Wavelength)	1.0
Band width(Vis)	1.0
Band width(Uv)	1.0

Stray Light** UUC* Reading at 220.0 nm	
Transimission T(%)	Absorbance(A)
0.020	3.7032

**Specific Acceptance :
Transmission ≤ 1.0 T(%), Absorbance ≥ 2.0 A
**Stray light not TISI Accredited

The reported uncertainty is based on a standard uncertainty mutiplied by a coverage factor *k*, providing a level of confidence of approximately 95%

End of Calibration Certificate

บริษัท พาราไซแอนติฟิค จำกัด
BARA SCIENTIFIC CO., LTD.

PREVENTIVE MAINTENANCE/ CALIBRATION

FTIR SPECTROPHOTOMETER
IRXross"SHIMADZU"

ID NO. : -
REPORT NO : I-A2-25-TK-6811-0398
DATE OF REPORT : 28 November 2025
COMPLETION DATE : 28 November 2025
NEXT DUE DATE : On November 2026

FOURIER TRANSFORM INFRARED SPECTROPHOTOMETER

SERIAL NO.	A22936201045
CUSTOMER	บริษัท เอส.พี.เอส. คอนซัลติ้ง เซอร์วิส จำกัด
ADDRESS	7 ถนนพหลโยธิน แขวงจอมพล เขตจตุจักร
	กรุงเทพมหานคร 10900
ATTENTION	คุณวราภรณ์ ภูวัด
PHONE	087-737-4171
FAX	-
DONE BY	นายเฉลิมชาติ คงไทย
SERVICE REPORT NO.	TK-6811-0398

SIGNED FOR AND ON BEHALF OF
BARA SCIENTIFIC CO., LTD.

เฉลิมชาติ

CHALERMCHAT KONGTHAI

TOTAL NUMBER OF PAGES : 39

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1.0 EQUIPMENT LISTING

EQUIPMENT	SERIAL NUMBER
IRXross	A22936201045

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2.0 OPERATIONAL TESTING AND QUALIFICATION

2.1 IRXross

TEST	PURPOSE	CHECK	COMMENTS
IRSOLUTION SOFTWARE	VERIFY VERSION OF SOFTWARE	OK	-
POWER SPECTRUM	VERIFY INTENSITY OF STATED WAVENUMBERS ARE WITHIN SPECIFICATIONS - 4600CM-1 (10.0 OR MORE) - 4000CM-1 (25.0) - 3000CM-1 (50.0) - MAX. WAVENUMBER (37.5) - 700CM-1 (10.0) - 500CM-1 (2.0) - 403CM-1 (0.5)	OK	-
100% BASELINE FLATNESS	VERIFY FLATNESS OF THE 100% BASELINE SPECIFICATION - 4600 ~ 2000CM-1 (+/- 4%T) 2000 ~ 750 CM-1 (+/- 2%T)	OK	-
WAVENUMBER ACCURACY	VERIFY WAVENUMBER ACCURACY WITH POLYSTYRENE FILM.AND ABSORPTION PEAKS AT THE WAVENUMBER OF 1601.4CM-1 AND 906.7CM-1 SHOULD BE WITHIN ±1.0CM-1	OK	-
LASER BEAM IN SAMPLE COMPARTMENT	VERIFY THAT THE BEAMSPLITTER IS NOT DAMAGED BY MOISTURE AND LASER BEAM IN SAMPLE COMPARTMENT SHOULD NOT BE SCATTERED.	OK	-

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3.0 SPECIFICATIONS OF EQUIPMENT

POWER SPECTRUM	INTENSITY OF STATED WAVENUMBERS SHOULD BE WITHIN - 4600CM-1 (10% power maximun value min.) - 4000CM-1 (25% power maximun value min.) - 3000CM-1 (50% power maximun value min.) - MAX. WAVENUMBER (37.5%) - 700CM-1 (10% power maximun value min.) - 500CM-1 (2% power maximun value min.) - 403CM-1 (0.5% power maximun value min.) - 351 CM-1 (0.01% power maximun value min.)
RESOLUTION	Difference between near 2870 cm-1 – 2851 cm-1 ≥ 18%T Difference between near 1589 cm-1 – 1583 cm-1 ≥ 12%T
WAVENUMBER ACCURACY	Wavelength accuracy at each wavelength lies within the prescribed range. - 3060.0cm-1 rating ±1.5cm-1 - 2849.5cm-1 rating ±1.5cm-1 - 1942.9cm-1 rating ±1.5cm-1 - 1601.2cm-1 rating ±1.0cm-1 - 1583.0cm-1 rating ±1.0cm-1 - 1154.5cm-1 rating ±1.0cm-1 - 1028.3cm-1 rating ±1.0cm-1
REPRODUCIBILITY OF WAVENUMBER	Difference between the two measured results (2849.5cm-1)≤±5.0 cm-1. Difference between the two measured results (1601.2cm-1)≤±1.0 cm-1. Difference between the two measured results (1028.3cm-1)≤±1.0 cm-1.
REPRODUCIBILITY OF TRANSMITTANCE	Difference between the two measured results (2849.5cm-1)≤±0.5 %T Difference between the two measured results (1601.2cm-1)≤±0.5 %T Difference between the two measured results (1028.3cm-1)≤±0.5 %T

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4.0 OPERATIONAL QUALIFICTION RECORD

4.1 POWER SPECTRUM CHECK

CONDITIONS	MEASURED AT TRANSMITTANCE MODE IN %T FROM 4600 TO 400CM-1 RESOLUTION SET TO 1CM-1			
SPECIFICATION	INTENSITY OF STATED WAVENUMBERS SHOULD BE WITHIN - 4600CM-1 (10% or more of MAX) - 4000CM-1 (25% or more of MAX.) - 3000CM-1 (50% or more of MAX.) - MAX. WAVENUMBER (37.5% or more) - 700CM-1 (10% or more of MAX.) - 500CM-1 (2% or more of MAX.) - 403CM-1 (0.5% or more of MAX.) - 351 CM-1 (0.01% or more of MAX.)			
RESULTS	**WAVELENGTH**	**MEASURED VALUE**	**STANDARD VALUE**	**PASS/ NO PASS**
	4600CM-1	**14.96**	**4.71**	**PASS**
	4000CM-1	**23.87**	**8.82**	**PASS**
	3000CM-1	**40.51**	**23.53**	**PASS**
	MAX. WAVENUMBER	**58.82**	**37.50**	**PASS**
	700CM-1	**13.44**	**5.88**	**PASS**
	500CM-1	**5.14**	**1.18**	**PASS**
	403CM-1	**1.58**	**0.29**	**PASS**
	351CM-1	**0.23**	**0.01**	**PASS**
DATA				

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CHALERMCHAT KONGTHAI

TOTAL NUMBER OF PAGES : 39

4.2 RESOLUTION CHECK

CONDITIONS	MEASURED AT TRANSMITTANCE MODE IN %T FROM 4600 TO 400CM-1 RESOLUTION SET TO 1CM-1					
SPECIFICATION	Difference between near 2870 cm-1 – 2851 cm-1 ≥ 18%T Difference between near 1589 cm-1 – 1583 cm-1 ≥ 12%T					
RESULTS	**WAVELENGTH**	**RATING**	**MEASURED VALUE**		**MEASURED DIFF.**	**PASS/ NO PASS**
			MAX	**MIN**		
	2870CM-1 -2850CM-1	18%T	**38.12**	**13.28**	**24.84**	**PASS**
	1589CM-1 - 1583 CM-1	12%T	**57.59**	**40.06**	**17.53**	**PASS**
DATA						

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CHALERMCHAT KONGTHAI

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4.3 WAVENUMBER ACCURACY CHECK

CONDITIONS	MEASURED AT TRANSMITTANCE MODE IN %T FROM 4600 TO 400CM-1 RESOLUTION SET TO 1CM-1
CONDITIONS	Wavelength accuracy at each wavelength lies within the prescribed range. - 3060.0cm-1 rating ±1.5cm-1 - 2849.5cm-1 rating ±1.5cm-1 - 1942.9cm-1 rating ±1.5cm-1 - 1601.2cm-1 rating ±1.0cm-1 - 1583.0cm-1 rating ±1.0cm-1 - 1154.5cm-1 rating ±1.0cm-1 - 1028.3cm-1 rating ±1.0cm-1

RESULTS

WAVELENGTH (CM-1)	MEASURED VALUE (CM-1)	ERROR (CM-1)	PASS/NO PASS
3060.0CM-1	**3060.1**	***0.1***	**PASS**
2849.5CM-1	**2849.9**	***0.4***	**PASS**
1942.9CM-1	**1943.3**	***0.4***	**PASS**
1601.2CM-1	**1600.9**	***-0.3***	**PASS**
1583.0CM-1	**1583.6**	***0.6***	**PASS**
1154.5CM-1	**1154.4**	***-0.1***	**PASS**
1028.3CM-1	**1028.1**	***-0.2***	**PASS**

DATA

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4.4 REPRODUCIBILITY OF WAVENUMBER CHECK

CONDITIONS	MEASURED AT TRANSMITTANCE MODE IN %T FROM 4600 TO 400CM-1 RESOLUTION SET TO 1CM-1
STANDARD	POLYSTYRENE STANDARD NIST STANDARD REFERENCE MATERIAL 1921
SPECIFICATION	Difference between the two measured results (2849.5cm-1)≤±5.0 cm-1. Difference between the two measured results (1601.2cm-1)≤±1.0 cm-1. Difference between the two measured results (1028.3cm-1)≤±1.0 cm-1.

RESULTS

ACTUAL PEAK (CM-1)	MEASURED PEAK (CM-1)		ERROR (CM-1)	PASS/NO PASS
	NO.1	NO.2		
2849.5	**2849.9**	**2849.9**	***0.0***	**PASS**
1601.2	**1600.9**	**1600.9**	***0.0***	**PASS**
1028.3	**1028.1**	**1028.1**	***0.0***	**PASS**

DATA

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TOTAL NUMBER OF PAGES : 39

4.5 REPRODUCIBILITY OF TRANSMITTANCE CHECK

CONDITIONS	MEASURED AT TRANSMITTANCE MODE IN %T FROM 4600 TO 400CM-1 RESOLUTION SET TO 1CM-1				
STANDARD	POLYSTYRENE STANDARD NIST STANDARD REFERENCE MATERIAL 1921				
SPECIFICATION	Difference between the two measured results (2849.5cm-1)≤±0.5 %T Difference between the two measured results (1601.2cm-1)≤±0.5 %T Difference between the two measured results (1028.3cm-1)≤±0.5 %T.				
RESULTS	**ACTUAL PEAK (CM-1)**	**MEASURED PEAK (%T)**		**ERROR (%T)**	**PASS/NO PASS**
		NO.1	**NO.2**		
	2849.5	**13.28**	**13.31**	***-0.03***	**PASS**
	1601.2	**8.78**	**8.79**	***-0.01***	**PASS**
	1028.3	**20.17**	**20.20**	***-0.03***	**PASS**
DATA					

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5.0 EQUIPMENT CERTIFICATION

THE TEST DATA HAS DETERMINED THAT THE EQUIPMENT DESCRIBED MEETS ALL SPECIFICATIONS OUTLINED IN THIS CALIBRATION REPORT.

REPORT PREPARED BY : ***CHALERMCHAT KONGTHAI***
SERVICE ENGINEER
BARA SCIENTIFIC CO., LTD.

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BARA SCIENTIFIC CO., LTD.

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========== SHIMADZU FTIR Validation Report(JP18) ==========

Instrument	: DESKTOP-5ULUA14-Instrument1	Overall Judgement	: PASS		
Serial No.	: A22936201045	Temperature	: 23	Humidity	: 40
Window	: KRS-5	Change-Beam	: Un-using	No. of Scans	: 45
Sample ID	:	File name	: 1128094918		
Sample name	: Polystyrene Film				
Option	:	Comments	:		
Inspected by	: System Administrator	Date/Time	: 2025-11-28/09:57:55		

Approved by : _____ Date : _____

---

1. Power spectrum — PASS

Wavenumber cm-1	Measured E	Standard E	
4600.0	14.96	4.71	PASS
4000.0	23.87	8.82	PASS
3000.0	40.51	23.53	PASS
at Maximum	58.82	37.50	PASS
700.0	13.44	5.88	PASS
500.0	5.14	1.18	PASS
403.0	1.58	0.29	PASS
351.0	0.23	0.01	PASS

---

2. Resolution — PASS

Wavenumber cm-1	Measured cm-1	Measured %T	Standard %T	
2870.0	2870.1	38.12		
2850.0	2849.9	13.28		
Peak depth(%T)		24.84	18.00	PASS
1589.0	1588.4	57.59		
1583.0	1583.6	40.06		
Peak depth(%T)		17.53	12.00	PASS

---

3. Wavenumber accuracy — PASS

Wavenumber cm-1	Measured cm-1	Error cm-1	Tolerance cm-1	
3060.0	3060.1	0.1	+/-1.5	PASS
2849.5	2849.9	0.4	+/-1.5	PASS
1942.9	1943.3	0.4	+/-1.5	PASS
1601.2	1600.9	-0.3	+/-1.0	PASS
1583.0	1583.6	0.6	+/-1.0	PASS
1154.5	1154.4	-0.1	+/-1.0	PASS
1028.3	1028.1	-0.2	+/-1.0	PASS

---

4. Reproducibility of Wavenumber — PASS

Wavenumber cm-1	No.1 cm-1	No.2 cm-1	Error cm-1	Tolerance cm-1	
2849.5	2849.9	2849.9	0.0	within5.0	PASS
1601.2	1600.9	1600.9	0.0	within1.0	PASS
1028.3	1028.1	1028.1	0.0	within1.0	PASS

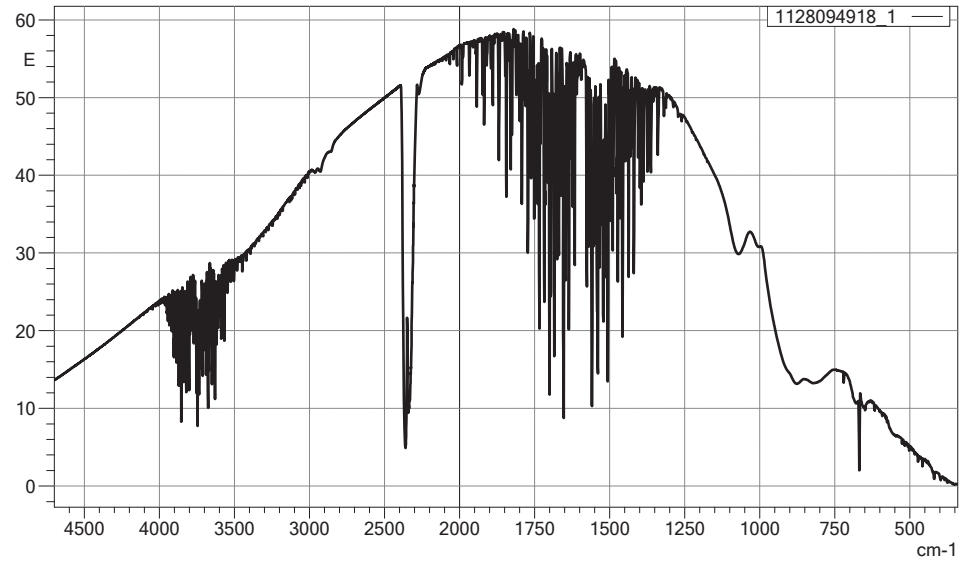
---

5. Reproducibility of Transmittance — PASS

Wavenumber cm-1	No.1 %T	No.2 %T	Error %T	Tolerance %T	
2849.5	13.28	13.31	-0.03	within0.5	PASS
1601.2	8.78	8.79	-0.01	within0.5	PASS
1028.3	20.17	20.20	-0.03	within0.5	PASS

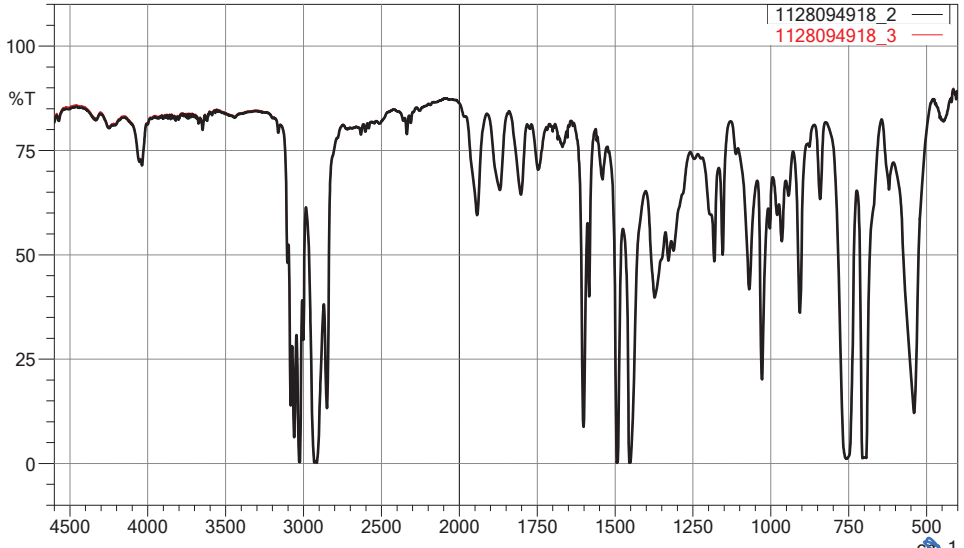
Power Spectrum

File name: C:\LabSolutions\LabSolutionsIR\Data\Jp\2025\1128094918_1.ispd



Polystyrene Spectra

File name: C:\LabSolutions\LabSolutionsIR\Data\Jp\2025\1128094918_2.ispd
C:\LabSolutions\LabSolutionsIR\Data\Jp\2025\1128094918_3.ispd



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```
************************************************************
FTIR Diagnostic Report
28/11/2568 09:48        IRXross  SerNo: A22936201045
User: System Administrator
************************************************************
Instrument:     IRXross
Interface:      Main/Zeta OK
Version:        Main ROM 1.00, Prog 1.01
                Zeta ROM 1.00, Prog 1.00
Ram[kB]:        Main 16284, Zeta 128

Checksum:       Main ROM 0X9326, PRG 0X12EC
Checksum:       Zeta ROM 000000, PRG 0X8E2D
************************************************************
Equipment:
Mirror: 0,      Aperture: Present
ASC A: None
External Beam:  None
Laser:  OK,     N2: OK
Beamsplitter:   KBr
Detector:       standard        Option1:        None
Light Source:   OK
Accessory:
************************************************************
Diagnostic Measurements:
Piezo Voltage 101:      PASS
Piezo Voltage 102:      PASS
Power Spectrum: PASS
Pos.[cm-1]:     3000    OK (Limit: 15)   Value: 101.813
Pos.[cm-1]:     2000    OK (Limit: 30)   Value: 140.342
Pos.[cm-1]:     1000    OK (Limit: 12)   Value: 74.7537
************************************************************
Working Time:
                        Started Used
Light source[IR]:       27/11/2568      25      hours
Laser:          27/11/2568      25      hours

Schedule of periodical inspection
        Last:   27/11/2568      Next:   364     Days later
************************************************************
```

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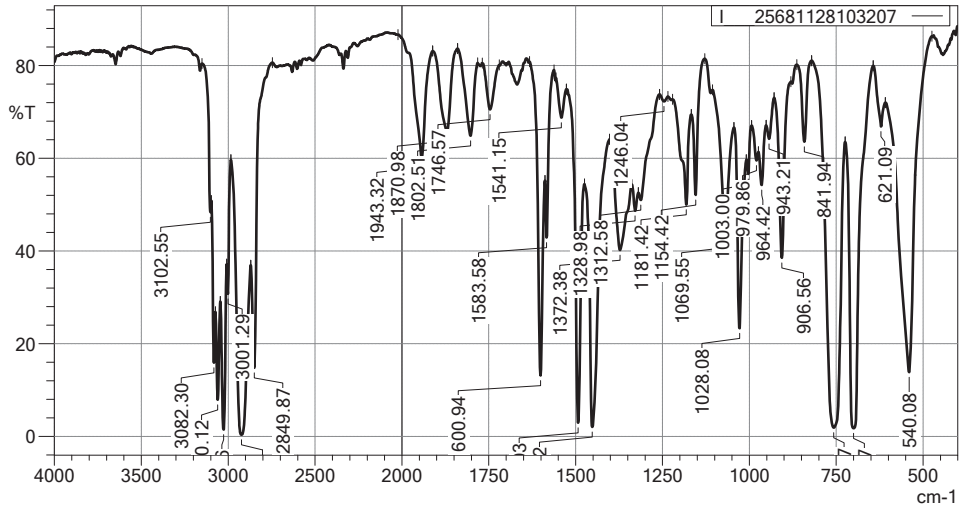
Peak Pick

Date: 28/11/2568 10:32:28
System Administrator

File name: D:\BSC\Installation 27-11-2025\I___25681128103207.ispd



	Item	Value
1	Comment	
2	Sample name	
3	Sample ID	
6	Apodization	SqrTriangle
7	Min	400
8	Max	4000
9	No. of Scans	45
10	Resolution	2 cm-1
11	FTIR Model	IRXross_DESKTOP-5ULUA14-Instrument1

Peak table

	Peak	Intensity	Corr. Intensity	Base (H)	Base (L)	Area	Corr. Area	Comment
1	540.08	13.86	65.49	608.55	474.50	5946.129	3157.287	
2	621.09	66.88	8.02	643.27	608.55	956.666	123.331	
3	700.17	1.79	66.63	724.28	643.27	4337.495	2048.452	
4	757.07	1.90	67.58	820.73	724.28	5671.401	2998.749	
5	841.94	63.56	17.06	863.16	820.73	1073.168	250.831	
6	906.56	38.52	36.12	928.74	880.52	1796.597	580.266	
7	943.21	64.22	5.11	951.89	928.74	747.858	55.245	
8	964.42	54.24	9.64	974.07	951.89	884.658	91.755	
9	979.86	59.55	3.54	993.36	974.07	717.974	27.937	
10	1003.00	56.61	5.84	1008.79	993.36	594.520	29.248	
11	1028.08	23.33	40.10	1044.47	1008.79	1879.034	563.969	
12	1069.55	42.91	27.02	1106.19	1044.47	2426.217	617.120	
13	1154.42	52.10	21.26	1166.95	1128.38	1148.107	201.785	
14	1181.42	50.02	20.30	1220.96	1166.95	1977.881	415.678	

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15	1246.04	72.28	1.27	1258.57	1234.46	653.907	16.196	
16	1312.58	51.00	3.94	1319.33	1258.57	2281.814	44.770	
17	1328.98	48.70	4.76	1338.62	1319.33	939.630	41.809	
18	1372.38	40.18	19.34	1402.27	1338.62	3196.882	601.435	
19	1452.42	2.06	55.36	1474.60	1402.27	4359.446	1414.938	
20	1492.93	2.97	58.68	1526.68	1474.60	2709.531	869.919	
21	1541.15	68.78	7.29	1556.58	1526.68	824.687	110.492	
22	1583.58	42.92	16.69	1588.41	1562.37	904.422	48.199	
23	1600.94	13.13	49.31	1632.77	1588.41	2019.479	601.098	
24	1746.57	70.55	9.82	1768.75	1719.57	1190.100	223.681	
25	1802.51	64.88	16.77	1840.12	1782.26	1474.020	439.268	
26	1870.98	65.92	17.52	1911.49	1840.12	1741.835	557.402	
27	1943.32	60.26	23.89	2022.40	1911.49	2447.143	773.601	
28	2849.87	14.83	29.22	2870.13	2745.72	4756.220	-371.243	
29	2923.17	0.37	47.07	2984.89	2870.13	8849.449	2915.762	
30	3001.29	30.77	13.60	3009.00	2984.89	1348.145	104.554	
31	3026.36	1.49	31.85	3045.65	3009.00	3096.413	645.893	
32	3060.12	7.90	20.04	3073.62	3045.65	2292.325	277.883	
33	3082.30	15.93	19.93	3096.77	3073.62	1626.199	211.110	
34	3102.55	48.41	5.63	3150.77	3096.77	1585.259	-269.910	

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Printed by: System Administrator

28/11/2568 11:10:03

===== Shimadzu LabSolutions Check the Program Files Report =====

Program Name: ActivationPackage
Version: 2.10.0
Date Checked: 28/11/2568 11:09:54(+07:00)
PC Information: Stand-alone PC(DESKTOP-5ULUA14)

File Name	File Size	File Date	Check Sum
ActivateTool.exe	Pass	Pass	Pass
ActivateCommon.dll	Pass	Pass	Pass
ActivateLicenseInfo.dll	Pass	Pass	Pass
ActivateDPAPI.dll	Pass	Pass	Pass
ActivateCommonWrapper.exe	Pass	Pass	Pass
LSSSWA.ocx	Pass	Pass	Pass
LSSSWADaemon.exe	Pass	Pass	Pass
sx32w.dll	Pass	Pass	Pass
ActivateTool.resources.dll	Pass	Pass	Pass
ActivateTool.resources.dll	Pass	Pass	Pass

Program Name: LabSolutions Mng
Version: 1.122
Date Checked: 28/11/2568 11:09:54(+07:00)
PC Information: Stand-alone PC(DESKTOP-5ULUA14)

File Name	File Size	File Date	Check Sum
___zd.ttf	Pass	Pass	Pass
admin.bmp	Pass	Pass	Pass
AxInterop.AcroPDFLib.dll	Pass	Pass	Pass
AxInterop.LSSDATAEXPLORERLib.dll	Pass	Pass	Pass
AxInterop.LSSSWALib.dll	Pass	Pass	Pass
AxInterop.SkyViewCOM.dll	Pass	Pass	Pass
Barcode2.dll	Pass	Pass	Pass
BizPrintCom.exe	Pass	Pass	Pass
DotNetZip.dll	Pass	Pass	Pass
dsofile.dll	Pass	Pass	Pass
EntityFramework.dll	Pass	Pass	Pass
EntityFramework.SqlServer.dll	Pass	Pass	Pass
extdllR.dll	Pass	Pass	Pass
FarPoint.CalcEngine.dll	Pass	Pass	Pass
FarPoint.Excel.dll	Pass	Pass	Pass
FarPoint.PDF.dll	Pass	Pass	Pass
FarPoint.PluginCalendar.WinForms.dll	Pass	Pass	Pass
FarPoint.Win.Chart.dll	Pass	Pass	Pass
FarPoint.Win.dll	Pass	Pass	Pass
FarPoint.Win.Ink.dll	Pass	Pass	Pass
FarPoint.Win.Spread.dll	Pass	Pass	Pass
FarPoint.Win.Spread.Html.dll	Pass	Pass	Pass
FarPoint.Win.TextRenderer.dll	Pass	Pass	Pass
FPBF.dll	Pass	Pass	Pass
fplib.dll	Pass	Pass	Pass
fplibn.dll	Pass	Pass	Pass
Interop.AcroPDFLib.dll	Pass	Pass	Pass
Interop.ADOX.dll	Pass	Pass	Pass
Interop.BizPrintCom.dll	Pass	Pass	Pass
Interop.CDFView.dll	Pass	Pass	Pass
Interop.DAO.dll	Pass	Pass	Pass
Interop.DSOFile.dll	Pass	Pass	Pass
Interop.Excel.dll	Pass	Pass	Pass
Interop.IRView.dll	Pass	Pass	Pass
Interop.LSSCompressCab.dll	Pass	Pass	Pass
Interop.LSSDATAEXPLORERLib.dll	Pass	Pass	Pass
Interop.LSSFileWrapper.dll	Pass	Pass	Pass
Interop.LSSSWALib.dll	Pass	Pass	Pass
Interop.Office.dll	Pass	Pass	Pass

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===== Shimadzu LabSolutions Check the Program Files Report =====

Interop.SKYPDFWRITERLIBLib.dll	Pass	Pass	Pass
Interop.SkyViewCOM.dll	Pass	Pass	Pass
Interop.SpectrumView.dll	Pass	Pass	Pass
Interop.VBIDE.dll	Pass	Pass	Pass
invalid.bmp	Pass	Pass	Pass
LabSolutionsAPI.dll	Pass	Pass	Pass
ldf_jb2.dll	Pass	Pass	Pass
LSSAccessControl.dll	Pass	Pass	Pass
LSSAccessControlCommonInfo.dll	Pass	Pass	Pass
LSSAcquisitionSequence.Client.dll	Pass	Pass	Pass
LSSAcquisitionSequence.Interface.dll	Pass	Pass	Pass
LSSAcquisitionSequence.Service.dll	Pass	Pass	Pass
LSSADCooperationSettings.exe	Pass	Pass	Pass
LSSADCooperationSettings.exe.manifest	Pass	Pass	Pass
LSSAgentConverter.exe	Pass	Pass	Pass
LSSAgentConverter.exe.manifest	Pass	Pass	Pass
LSSAgentConverter.XmlSerializers.dll	Pass	Pass	Pass
LSSAgentConverterCommonInfo.dll	Pass	Pass	Pass
LSSAgentConverterService.exe	Pass	Pass	Pass
LSSAgentConverterSetting.exe	Pass	Pass	Pass
LSSAgentConverterSetting.exe.manifest	Pass	Pass	Pass
LSSAgentConverterSetting.XmlSerializers.dll	Pass	Pass	Pass
LSSAutoRegister.exe	Pass	Pass	Pass
LSSAutoRegisterCommonInfomation.dll	Pass	Pass	Pass
LSSAutoRegisterCommonInfomation.XmlSerializers.dll	Pass	Pass	Pass
LSSAutoRegisterService.exe	Pass	Pass	Pass
LSSAutoRegisterSetting.exe	Pass	Pass	Pass
LSSBackup.exe	Pass	Pass	Pass
LSSBackup.exe.manifest	Pass	Pass	Pass
LSSBackup.XmlSerializers.dll	Pass	Pass	Pass
LSSBackupRestoreCL.dll	Pass	Pass	Pass
LSSBackupRestoreSV.dll	Pass	Pass	Pass
LSSBaseManagerCL.dll	Pass	Pass	Pass
LSSBaseManagerSV.dll	Pass	Pass	Pass
LSSBatchCreateMultiDataReport.dll	Pass	Pass	Pass
LSSBatchProcCL_RCW.dll	Pass	Pass	Pass
LSSBatchProcSV_RCW.dll	Pass	Pass	Pass
LSSBatchQueueCommunicationCL.dll	Pass	Pass	Pass
LSSBatchQueueCommunicationSV.dll	Pass	Pass	Pass
LSSBatchQueueManagerCL.dll	Pass	Pass	Pass
LSSBatchQueueManagerCommonInfo.dll	Pass	Pass	Pass
LSSBatchQueueManagerCommonInfo.XmlSerializers.dll	Pass	Pass	Pass
LSSBatchQueueManagerDlg.dll	Pass	Pass	Pass
LSSBatchQueueManagerDlg_RCW.dll	Pass	Pass	Pass
LSSBatchQueueManagerSV.dll	Pass	Pass	Pass
LSSBatchQueueSorting.dll	Pass	Pass	Pass
LSSBatchSetupMultiDataReport.dll	Pass	Pass	Pass
LSSCacheMaintenanceTool.exe	Pass	Pass	Pass
LSSCacheMaintenanceToolCore.dll	Pass	Pass	Pass
LSSCacheMaintenanceToolCUI.exe	Pass	Pass	Pass
LSSCacheManager.exe	Pass	Pass	Pass
LSSCacheManagerTask.bat	Pass	Pass	Pass
LSSCacheSV.dll	Pass	Pass	Pass
LSSCheckDBAccess.exe	Pass	Pass	Pass
LSSClientLicenseManagerMain.exe	Pass	Pass	Pass
LSSClientLicenseManagerTask.bat	Pass	Pass	Pass
LSSCommManager_RCW.dll	Pass	Pass	Pass
LSSCommonFunction.dll	Pass	Pass	Pass
LSSCommonFunction.XmlSerializers.dll	Pass	Pass	Pass
LSSCommonInfo.dll	Pass	Pass	Pass
LSSCommonInfo.XmlSerializers.dll	Pass	Pass	Pass
LSSCommonResource.dll	Pass	Pass	Pass
LSSCommonToolsMng.dll	Pass	Pass	Pass

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===== Shimadzu LabSolutions Check the Program Files Report =====

LSSCommunicationPoint.dll	Pass	Pass	Pass
LSSCompletionDBManager.dll	Pass	Pass	Pass
LSSCompletionManager.exe	Pass	Pass	Pass
LSSCompletionWCF.Client.dll	Pass	Pass	Pass
LSSCompletionWCF.Common.dll	Pass	Pass	Pass
LSSCompletionWCF.Service.dll	Pass	Pass	Pass
LSSCompressCab.dll	Pass	Pass	Pass
LSSConfigurationManager.exe	Pass	Pass	Pass
LSSConfigurationSV.dll	Pass	Pass	Pass
LSSCreateMsdeDb.exe	Pass	Pass	Pass
LSSCreateMsdeDb.exe.manifest	Pass	Pass	Pass
LSSCreateMsdeDbCUI.exe	Pass	Pass	Pass
LSSCreateMultiDataReport.dll	Pass	Pass	Pass
LSSCreateMultiDataReportTemplate.exe	Pass	Pass	Pass
LSSCreateMultiDataReportTemplate.exe.manifest	Pass	Pass	Pass
LSSCreateOQProject.exe	Pass	Pass	Pass
LSSCreateOracleDb.exe	Pass	Pass	Pass
LSSCreateOracleDb.exe.manifest	Pass	Pass	Pass
LSSCustomizeInfoManager.exe	Pass	Pass	Pass
LSSCustomizeInfoManager.exe.manifest	Pass	Pass	Pass
LSSCustomizeInfoManagerCommonInfo.dll	Pass	Pass	Pass
LSSCustomizeInfoManagerCommonInfo.XmlSerializers.dll	Pass	Pass	Pass
LSSDataExplorerEx.dll	Pass	Pass	Pass
LSSDataExplorerEx.ocx	Pass	Pass	Pass
LSSDataManage_RCW.dll	Pass	Pass	Pass
LSSDataManager.dll	Pass	Pass	Pass
LSSDataManagerCL.dll	Pass	Pass	Pass
LSSDataManagerCommonInfo.dll	Pass	Pass	Pass
LSSDataManagerCommonInfo.XmlSerializers.dll	Pass	Pass	Pass
LSSDataManagerForm.exe	Pass	Pass	Pass
LSSDataManagerForm.exe.manifest	Pass	Pass	Pass
LSSDataManagerHost.exe	Pass	Pass	Pass
LSSDataManagerHostExtendDb.exe	Pass	Pass	Pass
LSSDataManagerSV.dll	Pass	Pass	Pass
LSSDataManagerToolCommonInfo.dll	Pass	Pass	Pass
LSSDataManagerToolCommonInfo.XmlSerializers.dll	Pass	Pass	Pass
LSSDataUICommon.dll	Pass	Pass	Pass
LSSDataUICommon.XmlSerializers.dll	Pass	Pass	Pass
LSSDataWriter.dll	Pass	Pass	Pass
LSSDBAccessCL.dll	Pass	Pass	Pass
LSSDBAccessCommonInfo.dll	Pass	Pass	Pass
LSSDBAccessCommonInfo.XmlSerializers.dll	Pass	Pass	Pass
LSSDBAccessSV.dll	Pass	Pass	Pass
LSSDBAdminRevokeTool.exe	Pass	Pass	Pass
LSSDbCsMigrationCommon.dll	Pass	Pass	Pass
LSSDbExtensionForm.exe	Pass	Pass	Pass
LSSDbExtensionLibrary.dll	Pass	Pass	Pass
LSSDbExtensionMigrationTool.exe	Pass	Pass	Pass
LSSDBPasswordChangeTool.exe	Pass	Pass	Pass
LSSDbPatchForm.exe	Pass	Pass	Pass
LSSDefineSoftware.exe	Pass	Pass	Pass
LSSDefineSoftware.exe.manifest	Pass	Pass	Pass
LSSDefineSoftwareCommonInfo.dll	Pass	Pass	Pass
LSSDLog.dll	Pass	Pass	Pass
LSSDLogArchiver.exe	Pass	Pass	Pass
LSSDsoFileOperator.dll	Pass	Pass	Pass
LSSEventMail.dll	Pass	Pass	Pass
LSSEventMailSV.dll	Pass	Pass	Pass
LSSExtendDBController.exe	Pass	Pass	Pass
LSSFileChecker.dll	Pass	Pass	Pass
LSSFileTransCL.dll	Pass	Pass	Pass
LSSFileTransCommonInfo.dll	Pass	Pass	Pass
LSSFileTransCommonInfo.XmlSerializers.dll	Pass	Pass	Pass

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===== Shimadzu LabSolutions Check the Program Files Report =====

LSSFileTransSV.dll	Pass	Pass	Pass
LSSFingerPrintManager.exe	Pass	Pass	Pass
LSSFingerPrintManager.exe.manifest	Pass	Pass	Pass
LSSFLBackup.exe	Pass	Pass	Pass
LSSFLRestore.exe	Pass	Pass	Pass
LSSForcedLogout.exe	Pass	Pass	Pass
LSSForcedLogout.exe.manifest	Pass	Pass	Pass
LSSIndexOptimizeTool.exe	Pass	Pass	Pass
LSSInputAuditTrailForm.dll	Pass	Pass	Pass
LSSInstInfoFilePackageConversion.exe	Pass	Pass	Pass
LSSInstInfoFilePackageConversion.XmlSerializers.dll	Pass	Pass	Pass
LSSInstrumentCondition.dll	Pass	Pass	Pass
LSSInstrumentConditionAcqManagerCL.dll	Pass	Pass	Pass
LSSInstrumentConditionAcqMng.dll	Pass	Pass	Pass
LSSInstrumentConditionAcqMngHost.exe	Pass	Pass	Pass
LSSInstrumentConditionAcqSV.dll	Pass	Pass	Pass
LSSInstrumentConditionCommon.dll	Pass	Pass	Pass
LSSInstrumentConditionCommonInfo.dll	Pass	Pass	Pass
LSSInstrumentConditionCommonInfo.XmlSerializers.dll	Pass	Pass	Pass
LSSInstrumentConditionLssCL.dll	Pass	Pass	Pass
LSSInstrumentConditionLssMng.dll	Pass	Pass	Pass
LSSInstrumentConditionLssSV.dll	Pass	Pass	Pass
LSSInstrumentConditionWCF.Client.dll	Pass	Pass	Pass
LSSInstrumentConditionWCF.Common.dll	Pass	Pass	Pass
LSSInstrumentConditionWCF.Service.dll	Pass	Pass	Pass
LSSInstrumentFileImport.exe	Pass	Pass	Pass
LSSInstrumentManager.exe	Pass	Pass	Pass
LSSInstrumentManager.exe.manifest	Pass	Pass	Pass
LSSInstrumentManagerSV.dll	Pass	Pass	Pass
LSSLauncher.dll	Pass	Pass	Pass
LSSLauncherLite.exe	Pass	Pass	Pass
LSSLaunchingManager.exe	Pass	Pass	Pass
LSSLicenseInfoMngCommonInfo.dll	Pass	Pass	Pass
LSSLicenseInfoSV.dll	Pass	Pass	Pass
LSSLimsAssist.exe	Pass	Pass	Pass
LSSLimsAssistService.exe	Pass	Pass	Pass
LSSLimsCommonInfo.dll	Pass	Pass	Pass
LSSLimsCommonInfo.XmlSerializers.dll	Pass	Pass	Pass
LSSLimsInterface.exe	Pass	Pass	Pass
LSSLimsInterfaceService.exe	Pass	Pass	Pass
LSSLimsSetting.exe	Pass	Pass	Pass
LSSLimsSetting.exe.manifest	Pass	Pass	Pass
LSSLocalLog.mdb.Template	Pass	Pass	Pass
LSSLogBrowser.exe	Pass	Pass	Pass
LSSLogBrowser.exe.manifest	Pass	Pass	Pass
LSSLogCyclicRegister.dll	Pass	Pass	Pass
LSSLogDBAccess.exe	Pass	Pass	Pass
LSSLoginUserManager.dll	Pass	Pass	Pass
LSSLoginUserManager.exe	Pass	Pass	Pass
LSSLoginUserManager.exe.manifest	Pass	Pass	Pass
LSSLogManagerCL.dll	Pass	Pass	Pass
LSSLogManagerSV.dll	Pass	Pass	Pass
LSSMainWindow.exe	Pass	Pass	Pass
LSSMainWindow.exe.manifest	Pass	Pass	Pass
LSSMainWindowCommonInfo.dll	Pass	Pass	Pass
LSSMainWindowCommonInfo.XmlSerializers.dll	Pass	Pass	Pass
LSSMdbMigration.exe	Pass	Pass	Pass
LSSMngMsg.dll	Pass	Pass	Pass
LSSMngProxy.exe	Pass	Pass	Pass
LSSMngProxyRemotingObject.dll	Pass	Pass	Pass
LSSMngTools.dll	Pass	Pass	Pass
LSSMngToolsUI.dll	Pass	Pass	Pass
LSSMsgWrapper.dll	Pass	Pass	Pass

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===== Shimadzu LabSolutions Check the Program Files Report =====

LSSMultiDataExcelFile.dll	Pass	Pass	Pass
LSSMultiDataRegisterSettingCL.dll	Pass	Pass	Pass
LSSMultiDataRegisterSettingCommon.dll	Pass	Pass	Pass
LSSMultiDataRegisterSettingCommon.XmlSerializers.dll	Pass	Pass	Pass
LSSMultiDataRegisterSettingCommonFunc.dll	Pass	Pass	Pass
LSSMultiDataRegisterSettingSV.dll	Pass	Pass	Pass
LSSMultiDataReportCL.dll	Pass	Pass	Pass
LSSMultiDataReportCommonInfo.dll	Pass	Pass	Pass
LSSMultiDataReportConfiguration.exe	Pass	Pass	Pass
LSSMultiDataReportConfiguration.exe.manifest	Pass	Pass	Pass
LSSNamedPipeClientToAnalysis.dll	Pass	Pass	Pass
LSSNetworkPrint.dll	Pass	Pass	Pass
LSSNetworkPrintCL.dll	Pass	Pass	Pass
LSSNetworkPrintCommonInfo.dll	Pass	Pass	Pass
LSSNetworkPrintCommonInfo.XmlSerializers.dll	Pass	Pass	Pass
LSSNetworkPrintHost.exe	Pass	Pass	Pass
LSSNetworkPrintManagerCL.dll	Pass	Pass	Pass
LSSNetworkPrintManagerSV.dll	Pass	Pass	Pass
LSSNetworkPrintService.exe	Pass	Pass	Pass
LSSNetworkPrintSV.dll	Pass	Pass	Pass
LSSObstacleManager.dll	Pass	Pass	Pass
LSSObstacleManagerCommonInfo.dll	Pass	Pass	Pass
LSSObstacleManagerCommonInfo.XmlSerializers.dll	Pass	Pass	Pass
LSSObstacleMeasuresInfoWatch.dll	Pass	Pass	Pass
LSSPCinfoDisp.exe	Pass	Pass	Pass
LSSPCinfoDisp.exe.manifest	Pass	Pass	Pass
LSSPcInfoForm.exe.manifest	Pass	Pass	Pass
LSSPcInfoManagerCL.dll	Pass	Pass	Pass
LSSPcInfoManagerSV.dll	Pass	Pass	Pass
LSSPrinterManager.exe	Pass	Pass	Pass
LSSPrinterManager.exe.manifest	Pass	Pass	Pass
LSSPrintPreview.dll	Pass	Pass	Pass
LSSProcessController.exe	Pass	Pass	Pass
LSSProcessManager.dll	Pass	Pass	Pass
LSSProfileDBAccess.exe	Pass	Pass	Pass
LSSProfileDBAccessCommonInfo.dll	Pass	Pass	Pass
LSSProfileInfoManagerSV.dll	Pass	Pass	Pass
LSSProgChk.exe	Pass	Pass	Pass
LSSProgChk.exe.manifest	Pass	Pass	Pass
LSSProgChkSV.dll	Pass	Pass	Pass
LSSProjectManager.exe	Pass	Pass	Pass
LSSProjectManager.exe.manifest	Pass	Pass	Pass
LSSProjectManagerSV.dll	Pass	Pass	Pass
LSSProjectPolicyForm.dll	Pass	Pass	Pass
LSSProjectSettingForm.dll	Pass	Pass	Pass
LSSRAS.dll	Pass	Pass	Pass
LSSRASCommonInfo.dll	Pass	Pass	Pass
LSSRASCommonInfo.XmlSerializers.dll	Pass	Pass	Pass
LSSRASManager.dll	Pass	Pass	Pass
LSSRASManager.exe	Pass	Pass	Pass
LSSRASService.exe	Pass	Pass	Pass
LSSRegisterPcInfo.exe	Pass	Pass	Pass
LSSReleaseLockoutPc.exe	Pass	Pass	Pass
LSSReleaseLockoutPc.exe.manifest	Pass	Pass	Pass
LSSReleaseLockoutUser.exe	Pass	Pass	Pass
LSSReleaseLockoutUser.exe.manifest	Pass	Pass	Pass
LSSRemoteControllerCL.dll	Pass	Pass	Pass
LSSRemoteControllerCommonInfo.dll	Pass	Pass	Pass
LSSRemoteControllerCommonInfo.XmlSerializers.dll	Pass	Pass	Pass
LSSRemoteControllerSorting.dll	Pass	Pass	Pass
LSSRemoteControllerSV.dll	Pass	Pass	Pass
LSSReportGenerator.dll	Pass	Pass	Pass
LSSRestore.exe	Pass	Pass	Pass

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===== Shimadzu LabSolutions Check the Program Files Report =====

LSSRestore.exe.manifest	Pass	Pass	Pass
LSSRestore.XmlSerializers.dll	Pass	Pass	Pass
LSSRightsGroupManager.exe	Pass	Pass	Pass
LSSRightsGroupManager.exe.manifest	Pass	Pass	Pass
LSSSendEventSetting.dll	Pass	Pass	Pass
LSSSendEventSettingCL.dll	Pass	Pass	Pass
LSSSendEventSettingForm.dll	Pass	Pass	Pass
LSSSendEventSettingSV.dll	Pass	Pass	Pass
LSSService.exe	Pass	Pass	Pass
LSSService.exe.manifest	Pass	Pass	Pass
LSSServiceController.exe	Pass	Pass	Pass
LSSServiceMonitor.exe	Pass	Pass	Pass
LSSSetDbConnection.exe	Pass	Pass	Pass
LSSSetDbConnection.exe.manifest	Pass	Pass	Pass
LSSSetMdbForm.exe	Pass	Pass	Pass
LSSSetMdbForm.exe.manifest	Pass	Pass	Pass
LSSSetPrinterInfoDialog.dll	Pass	Pass	Pass
LSSSetupDbConnectionCL.dll	Pass	Pass	Pass
LSSSetupDbConnectionCommonInfo.dll	Pass	Pass	Pass
LSSSetupDbConnectionSV.dll	Pass	Pass	Pass
LSSSetupMdbCommonInfo.dll	Pass	Pass	Pass
LSSSetupMdbCommonInfo.XmlSerializers.dll	Pass	Pass	Pass
LSSSmzAtstEx.ocx	Pass	Pass	Pass
LSSSmzAtstExAdapter.dll	Pass	Pass	Pass
LSSSortingCL.dll	Pass	Pass	Pass
LSSSortingController.exe	Pass	Pass	Pass
LSSSortingManager.dll	Pass	Pass	Pass
LSSSortingSV.dll	Pass	Pass	Pass
LSSSpreadReportCommonInfo.dll	Pass	Pass	Pass
LSSSpreadReportCreaterCL.dll	Pass	Pass	Pass
LSSSpreadReportCreaterSV.exe	Pass	Pass	Pass
LSSSpreadReportTemplateEditor.exe	Pass	Pass	Pass
LSSSpreadReportTemplateEditorForm.dll	Pass	Pass	Pass
LSSSqlAccess.dll	Pass	Pass	Pass
LSSSqlConversion.exe	Pass	Pass	Pass
LSSSysProjSettingCommonInfo.dll	Pass	Pass	Pass
LSSSysProjSettingManagerSV.dll	Pass	Pass	Pass
LSSSystemBackup.exe	Pass	Pass	Pass
LSSSystemBackup_diff.bat	Pass	Pass	Pass
LSSSystemBackupRestore.dll	Pass	Pass	Pass
LSSSystemDBAccess.exe	Pass	Pass	Pass
LSSSystemInfoPrint.exe	Pass	Pass	Pass
LSSSystemInfoPrint.exe.manifest	Pass	Pass	Pass
LSSSystemManager.exe	Pass	Pass	Pass
LSSSystemManagerCL.dll	Pass	Pass	Pass
LSSSystemManagerCL.XmlSerializers.dll	Pass	Pass	Pass
LSSSystemPolicy.exe	Pass	Pass	Pass
LSSSystemPolicy.exe.manifest	Pass	Pass	Pass
LSSSystemPolicyCommonInfo.dll	Pass	Pass	Pass
LSSSystemPolicySV.dll	Pass	Pass	Pass
LSSSystemRestore.exe	Pass	Pass	Pass
LSSSystemSetting.exe	Pass	Pass	Pass
LSSSystemSetting.exe.manifest	Pass	Pass	Pass
LSSUICommon.dll	Pass	Pass	Pass
LSSUnregDataManager.exe	Pass	Pass	Pass
LSSUnregDataManager.XmlSerializers.dll	Pass	Pass	Pass
LSSUpdateObstacleDBAcq.exe	Pass	Pass	Pass
LSSUpdateObstacleDBLss.exe	Pass	Pass	Pass
LSSUpdateObstacleWCF.Client.dll	Pass	Pass	Pass
LSSUpdateObstacleWCF.Common.dll	Pass	Pass	Pass
LSSUpdateObstacleWCF.Service.dll	Pass	Pass	Pass
LSSUserGroupManager.exe	Pass	Pass	Pass
LSSUserGroupManager.exe.manifest	Pass	Pass	Pass

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===== Shimadzu LabSolutions Check the Program Files Report =====

LSSUserManager.exe	Pass	Pass	Pass
LSSUserManager.exe.manifest	Pass	Pass	Pass
LSSUserManagerSV.dll	Pass	Pass	Pass
LSSValidationSupportCommonInfo.dll	Pass	Pass	Pass
LSSValidationSupportCommonInfo.XmlSerializers.dll	Pass	Pass	Pass
LSSWCFHelper.dll	Pass	Pass	Pass
LSSWebBrowser.exe	Pass	Pass	Pass
LSSWin32.dll	Pass	Pass	Pass
LSSWindowLockMng.dll	Pass	Pass	Pass
LSSWindowLockMngSV.dll	Pass	Pass	Pass
LSSWindowsDomainAccessService.exe	Pass	Pass	Pass
LSSWorkFolderCleaner.exe	Pass	Pass	Pass
lwf_jp2.dll	Pass	Pass	Pass
NLog.dll	Pass	Pass	Pass
nrmluser.bmp	Pass	Pass	Pass
Oracle.ManagedDataAccess.dll	Pass	Pass	Pass
Oracle.ManagedDataAccess.EntityFramework.dll	Pass	Pass	Pass
PkuiCom.dll	Pass	Pass	Pass
policy.6.0.FarPoint.Win.dll	Pass	Pass	Pass
policy.6.0.FarPoint.Win.Spread.dll	Pass	Pass	Pass
QueMng.mdb.Template	Pass	Pass	Pass
RightsFilterConfig_000.xml	Pass	Pass	Pass
Shimadzu.iQLinks.WebApi.Client.dll	Pass	Pass	Pass
Shimadzu.iQLinks.WebApi.Common.dll	Pass	Pass	Pass
Shimadzu.LabSolutions.Frameworks.dll	Pass	Pass	Pass
SkyPDFAPI.dll	Pass	Pass	Pass
SkyPDFCacheFactory.dll	Pass	Pass	Pass
SkyPDFColorSpaceFactory.dll	Pass	Pass	Pass
SkyPDFCore.dll	Pass	Pass	Pass
SkyPDFDocument.dll	Pass	Pass	Pass
SkyPDFFilterEncoder.dll	Pass	Pass	Pass
SkyPDFFontManager.dll	Pass	Pass	Pass
SkyPDFManager.dll	Pass	Pass	Pass
SkyPDFPreFlight.dll	Pass	Pass	Pass
SkyPDFRenderer.dll	Pass	Pass	Pass
SkyPDFSecurityHandlerFactory.dll	Pass	Pass	Pass
SkyPDFToolsSDK.sdkIng_en.dll	Pass	Pass	Pass
SkyPDFToolsSDK.sdkIng_jp.dll	Pass	Pass	Pass
SkyPDFValidator.dll	Pass	Pass	Pass
SkyPDFWriterLib.dll	Pass	Pass	Pass
SkySignature.dll	Pass	Pass	Pass
SkyViewCOM.dll	Pass	Pass	Pass
SkyViewCOM.dll.intermediate.manifest	Pass	Pass	Pass
SmzAtst.lic	Pass	Pass	Pass
sqlceca35.dll	Pass	Pass	Pass
sqlcecompact35.dll	Pass	Pass	Pass
sqlceer35EN.dll	Pass	Pass	Pass
sqlceme35.dll	Pass	Pass	Pass
sqlceoledb35.dll	Pass	Pass	Pass
sqlceqp35.dll	Pass	Pass	Pass
sqlcese35.dll	Pass	Pass	Pass
Stingray.GridControl70.dll	Pass	Pass	Pass
Stingray.GridControl71.dll	Pass	Pass	Pass
Stingray.GridUtils70.dll	Pass	Pass	Pass
Stingray.GridUtils71.dll	Pass	Pass	Pass
sx32w.dll	Pass	Pass	Pass
System.Data.SqlServerCe.dll	Pass	Pass	Pass
System.Data.SqlServerCe.Entity.dll	Pass	Pass	Pass
UNLHA32.DLL	Pass	Pass	Pass
UNLHA32.TXT	Pass	Pass	Pass
vrfdllR.dll	Pass	Pass	Pass
zlib1.dll	Pass	Pass	Pass
83pv-RKSJ-H.bin	Pass	Pass	Pass

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===== Shimadzu LabSolutions Check the Program Files Report =====

90msp-RKSJ-H.bin	Pass	Pass	Pass
90msp-RKSJ-V.bin	Pass	Pass	Pass
90ms-RKSJ-H.bin	Pass	Pass	Pass
90ms-RKSJ-UCS2.bin	Pass	Pass	Pass
90ms-RKSJ-V.bin	Pass	Pass	Pass
90pv-RKSJ-H.bin	Pass	Pass	Pass
90pv-RKSJ-UCS2.bin	Pass	Pass	Pass
90pv-RKSJ-UCS2C.bin	Pass	Pass	Pass
Add-RKSJ-H.bin	Pass	Pass	Pass
Add-RKSJ-V.bin	Pass	Pass	Pass
Adobe-CNS1-3.bin	Pass	Pass	Pass
Adobe-CNS1-UCS2.bin	Pass	Pass	Pass
Adobe-GB1-4.bin	Pass	Pass	Pass
Adobe-GB1-UCS2.bin	Pass	Pass	Pass
Adobe-Japan1-4.bin	Pass	Pass	Pass
Adobe-Japan1-UCS2.bin	Pass	Pass	Pass
Adobe-Korea1-2.bin	Pass	Pass	Pass
Adobe-Korea1-UCS2.bin	Pass	Pass	Pass
B5pc-H.bin	Pass	Pass	Pass
B5pc-UCS2.bin	Pass	Pass	Pass
B5pc-UCS2C.bin	Pass	Pass	Pass
B5pc-V.bin	Pass	Pass	Pass
CNS-EUC-H.bin	Pass	Pass	Pass
CNS-EUC-V.bin	Pass	Pass	Pass
ETen-B5-H.bin	Pass	Pass	Pass
ETen-B5-UCS2.bin	Pass	Pass	Pass
ETen-B5-V.bin	Pass	Pass	Pass
EUC-H.bin	Pass	Pass	Pass
EUC-V.bin	Pass	Pass	Pass
Ext-RKSJ-H.bin	Pass	Pass	Pass
Ext-RKSJ-V.bin	Pass	Pass	Pass
GB-EUC-H.bin	Pass	Pass	Pass
GB-EUC-V.bin	Pass	Pass	Pass
GBK2K-H.bin	Pass	Pass	Pass
GBK2K-V.bin	Pass	Pass	Pass
GBK-EUC-H.bin	Pass	Pass	Pass
GBK-EUC-UCS2.bin	Pass	Pass	Pass
GBK-EUC-V.bin	Pass	Pass	Pass
GBKp-EUC-H.bin	Pass	Pass	Pass
GBKp-EUC-V.bin	Pass	Pass	Pass
GBpc-EUC-H.bin	Pass	Pass	Pass
GBpc-EUC-UCS2.bin	Pass	Pass	Pass
GBpc-EUC-UCS2C.bin	Pass	Pass	Pass
GBpc-EUC-V.bin	Pass	Pass	Pass
GBT-EUC-H.bin	Pass	Pass	Pass
GBT-EUC-V.bin	Pass	Pass	Pass
H.bin	Pass	Pass	Pass
HKscs-B5-H.bin	Pass	Pass	Pass
HKscs-B5-V.bin	Pass	Pass	Pass
Identity-H.bin	Pass	Pass	Pass
Identity-V.bin	Pass	Pass	Pass
KSC-EUC-H.bin	Pass	Pass	Pass
KSC-EUC-V.bin	Pass	Pass	Pass
KSCms-UHC-H.bin	Pass	Pass	Pass
KSCms-UHC-HW-H.bin	Pass	Pass	Pass
KSCms-UHC-HW-V.bin	Pass	Pass	Pass
KSCms-UHC-UCS2.bin	Pass	Pass	Pass
KSCms-UHC-V.bin	Pass	Pass	Pass
KSCpc-EUC-H.bin	Pass	Pass	Pass
KSCpc-EUC-UCS2.bin	Pass	Pass	Pass
KSCpc-EUC-UCS2C.bin	Pass	Pass	Pass
UniCNS-UCS2-H.bin	Pass	Pass	Pass
UniCNS-UCS2-V.bin	Pass	Pass	Pass

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===== Shimadzu LabSolutions Check the Program Files Report =====

UniGB-UCS2-H.bin	Pass	Pass	Pass
UniGB-UCS2-V.bin	Pass	Pass	Pass
UniJIS-UCS2-H.bin	Pass	Pass	Pass
UniJIS-UCS2-HW-H.bin	Pass	Pass	Pass
UniJIS-UCS2-HW-V.bin	Pass	Pass	Pass
UniJIS-UCS2-V.bin	Pass	Pass	Pass
UniKS-UCS2-H.bin	Pass	Pass	Pass
UniKS-UCS2-V.bin	Pass	Pass	Pass
V.bin	Pass	Pass	Pass
83pv-RKSJ-H.bin	Pass	Pass	Pass
90msp-RKSJ-H.bin	Pass	Pass	Pass
90msp-RKSJ-V.bin	Pass	Pass	Pass
90ms-RKSJ-H.bin	Pass	Pass	Pass
90ms-RKSJ-UCS2.bin	Pass	Pass	Pass
90ms-RKSJ-V.bin	Pass	Pass	Pass
90pv-RKSJ-H.bin	Pass	Pass	Pass
90pv-RKSJ-UCS2.bin	Pass	Pass	Pass
90pv-RKSJ-UCS2C.bin	Pass	Pass	Pass
Add-RKSJ-H.bin	Pass	Pass	Pass
Add-RKSJ-V.bin	Pass	Pass	Pass
Adobe-CNS1-3.bin	Pass	Pass	Pass
Adobe-CNS1-UCS2.bin	Pass	Pass	Pass
Adobe-GB1-4.bin	Pass	Pass	Pass
Adobe-GB1-UCS2.bin	Pass	Pass	Pass
Adobe-Identity-UCS2.bin	Pass	Pass	Pass
Adobe-Japan1-4.bin	Pass	Pass	Pass
Adobe-Japan1-UCS2.bin	Pass	Pass	Pass
Adobe-Japan1-UCS2_4.bin	Pass	Pass	Pass
Adobe-Korea1-2.bin	Pass	Pass	Pass
Adobe-Korea1-UCS2.bin	Pass	Pass	Pass
B5pc-H.bin	Pass	Pass	Pass
B5pc-UCS2.bin	Pass	Pass	Pass
B5pc-UCS2C.bin	Pass	Pass	Pass
B5pc-V.bin	Pass	Pass	Pass
CNS-EUC-H.bin	Pass	Pass	Pass
CNS-EUC-V.bin	Pass	Pass	Pass
ETen-B5-H.bin	Pass	Pass	Pass
ETen-B5-UCS2.bin	Pass	Pass	Pass
ETen-B5-V.bin	Pass	Pass	Pass
ETenms-B5-H.bin	Pass	Pass	Pass
ETenms-B5-V.bin	Pass	Pass	Pass
EUC-H.bin	Pass	Pass	Pass
EUC-V.bin	Pass	Pass	Pass
Ext-RKSJ-H.bin	Pass	Pass	Pass
Ext-RKSJ-V.bin	Pass	Pass	Pass
GB-EUC-H.bin	Pass	Pass	Pass
GB-EUC-V.bin	Pass	Pass	Pass
GBK2K-H.bin	Pass	Pass	Pass
GBK2K-V.bin	Pass	Pass	Pass
GBK-EUC-H.bin	Pass	Pass	Pass
GBK-EUC-UCS2.bin	Pass	Pass	Pass
GBK-EUC-V.bin	Pass	Pass	Pass
GBKp-EUC-H.bin	Pass	Pass	Pass
GBKp-EUC-V.bin	Pass	Pass	Pass
GBpc-EUC-H.bin	Pass	Pass	Pass
GBpc-EUC-UCS2.bin	Pass	Pass	Pass
GBpc-EUC-UCS2C.bin	Pass	Pass	Pass
GBpc-EUC-V.bin	Pass	Pass	Pass
GBT-EUC-H.bin	Pass	Pass	Pass
GBT-EUC-V.bin	Pass	Pass	Pass
H.bin	Pass	Pass	Pass
HKscs-B5-H.bin	Pass	Pass	Pass
HKscs-B5-V.bin	Pass	Pass	Pass

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===== Shimadzu LabSolutions Check the Program Files Report =====

Identity-H.bin	Pass	Pass	Pass
Identity-V.bin	Pass	Pass	Pass
KSC-EUC-H.bin	Pass	Pass	Pass
KSC-EUC-V.bin	Pass	Pass	Pass
KSCms-UHC-H.bin	Pass	Pass	Pass
KSCms-UHC-HW-H.bin	Pass	Pass	Pass
KSCms-UHC-HW-V.bin	Pass	Pass	Pass
KSCms-UHC-UCS2.bin	Pass	Pass	Pass
KSCms-UHC-V.bin	Pass	Pass	Pass
KSCpc-EUC-H.bin	Pass	Pass	Pass
KSCpc-EUC-UCS2.bin	Pass	Pass	Pass
KSCpc-EUC-UCS2C.bin	Pass	Pass	Pass
UniCNS-UCS2-H.bin	Pass	Pass	Pass
UniCNS-UCS2-V.bin	Pass	Pass	Pass
UniCNS-UTF16-H.bin	Pass	Pass	Pass
UniCNS-UTF16-V.bin	Pass	Pass	Pass
UniGB-UCS2-H.bin	Pass	Pass	Pass
UniGB-UCS2-V.bin	Pass	Pass	Pass
UniGB-UTF16-H.bin	Pass	Pass	Pass
UniGB-UTF16-V.bin	Pass	Pass	Pass
UniJIS-UCS2-H.bin	Pass	Pass	Pass
UniJIS-UCS2-HW-H.bin	Pass	Pass	Pass
UniJIS-UCS2-HW-V.bin	Pass	Pass	Pass
UniJIS-UCS2-V.bin	Pass	Pass	Pass
UniJIS-UTF16-H.bin	Pass	Pass	Pass
UniJIS-UTF16-V.bin	Pass	Pass	Pass
UniKS-UCS2-H.bin	Pass	Pass	Pass
UniKS-UCS2-V.bin	Pass	Pass	Pass
UniKS-UTF16-H.bin	Pass	Pass	Pass
UniKS-UTF16-V.bin	Pass	Pass	Pass
V.bin	Pass	Pass	Pass
AdobeRGB1998.icc	Pass	Pass	Pass
AppleRGB.icc	Pass	Pass	Pass
CoatedFOGRA27.icc	Pass	Pass	Pass
CoatedFOGRA39.icc	Pass	Pass	Pass
CoatedGRACoL2006.icc	Pass	Pass	Pass
ColorMatchRGB.icc	Pass	Pass	Pass
JapanColor2001Coated.icc	Pass	Pass	Pass
JapanColor2001Uncoated.icc	Pass	Pass	Pass
JapanColor2002Newspaper.icc	Pass	Pass	Pass
JapanColor2003WebCoated.icc	Pass	Pass	Pass
JapanWebCoated.icc	Pass	Pass	Pass
sRGB_IEC61966-2-1_black_scaled.icc	Pass	Pass	Pass
UncoatedFOGRA29.icc	Pass	Pass	Pass
USWebCoatedSWOP.icc	Pass	Pass	Pass
USWebUncoated.icc	Pass	Pass	Pass
WebCoatedFOGRA28.icc	Pass	Pass	Pass
WebCoatedSWOP2006Grade3.icc	Pass	Pass	Pass
WebCoatedSWOP2006Grade5.icc	Pass	Pass	Pass
SkyPKISecurity.sppi	Pass	Pass	Pass
SkySigRegular.sppi	Pass	Pass	Pass
dsofile.dll	Pass	Pass	Pass
LSSDsoInfoOperator_x64.exe	Pass	Pass	Pass

Program Name: LabSolutions Mng FL
Version: 1.122
Date Checked: 28/11/2568 11:09:54(+07:00)
PC Information: Stand-alone PC(DESKTOP-5ULUA14)

File Name	File Size	File Date	Check Sum
LSSLicenseMergeTool.exe	Pass	Pass	Pass

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===== Shimadzu LabSolutions Check the Program Files Report =====

Program Name: LabSolutions Log Collection Tool
Version: 1.1.0
Date Checked: 28/11/2568 11:09:54(+07:00)
PC Information: Stand-alone PC(DESKTOP-5ULUA14)

File Name	File Size	File Date	Check Sum
7za.exe	Pass	Pass	Pass
BetterFolderBrowser.dll	Pass	Pass	Pass
BetterFolderBrowser.xml	Pass	Pass	Pass
CsvHelper.dll	Pass	Pass	Pass
CsvHelper.xml	Pass	Pass	Pass
Google.Protobuf.dll	Pass	Pass	Pass
Google.Protobuf.xml	Pass	Pass	Pass
Grpc.Core.Api.dll	Pass	Pass	Pass
Grpc.Core.Api.xml	Pass	Pass	Pass
Grpc.Core.dll	Pass	Pass	Pass
Grpc.Core.xml	Pass	Pass	Pass
grpc_csharp_ext.x64.dll	Pass	Pass	Pass
grpc_csharp_ext.x86.dll	Pass	Pass	Pass
libgrpc_csharp_ext.x64.dylib	Pass	Pass	Pass
libgrpc_csharp_ext.x64.so	Pass	Pass	Pass
libgrpc_csharp_ext.x86.dylib	Pass	Pass	Pass
libgrpc_csharp_ext.x86.so	Pass	Pass	Pass
LogCollectionTool.Data.dll	Pass	Pass	Pass
LogCollectionTool.exe	Pass	Pass	Pass
LogCollectionToolSV.exe	Pass	Pass	Pass
ReactiveProperty.dll	Pass	Pass	Pass
ReactiveProperty.NET46.dll	Pass	Pass	Pass
ReactiveProperty.NET46.xml	Pass	Pass	Pass
ReactiveProperty.xml	Pass	Pass	Pass
System.Buffers.dll	Pass	Pass	Pass
System.Buffers.xml	Pass	Pass	Pass
System.Memory.dll	Pass	Pass	Pass
System.Memory.xml	Pass	Pass	Pass
System.Numerics.Vectors.dll	Pass	Pass	Pass
System.Numerics.Vectors.xml	Pass	Pass	Pass
System.Reactive.Core.dll	Pass	Pass	Pass
System.Reactive.Core.xml	Pass	Pass	Pass
System.Reactive.dll	Pass	Pass	Pass
System.Reactive.Interfaces.dll	Pass	Pass	Pass
System.Reactive.Interfaces.xml	Pass	Pass	Pass
System.Reactive.Linq.dll	Pass	Pass	Pass
System.Reactive.Linq.xml	Pass	Pass	Pass
System.Reactive.xml	Pass	Pass	Pass
System.Runtime.CompilerServices.Unsafe.dll	Pass	Pass	Pass
System.Runtime.CompilerServices.Unsafe.xml	Pass	Pass	Pass
System.Threading.Tasks.Extensions.dll	Pass	Pass	Pass
System.Threading.Tasks.Extensions.xml	Pass	Pass	Pass
System.ValueTuple.dll	Pass	Pass	Pass
System.ValueTuple.xml	Pass	Pass	Pass
Xceed.Wpf.Toolkit.dll	Pass	Pass	Pass

Program Name: IR Pilot
Version: 1.11
Date Checked: 28/11/2568 11:09:54(+07:00)
PC Information: Stand-alone PC(DESKTOP-5ULUA14)

File Name	File Size	File Date	Check Sum
IRPilot.exe	Pass	Pass	Pass
IRPilotInstaller.exe	Pass	Pass	Pass

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===== Shimadzu LabSolutions Check the Program Files Report =====

IRPilot.resources.dll	Pass	Pass	Pass
IRPilot.resources.dll	Pass	Pass	Pass
IRPilot.resources.dll	Pass	Pass	Pass
32880IRPilot.bas	Pass	Pass	Pass
32880IRPilot.icsq	Pass	Pass	Pass

Program Name: LabSolutions IR
Version: 2.34
Date Checked: 28/11/2568 11:09:54(+07:00)
PC Information: Stand-alone PC(DESKTOP-5ULUA14)

File Name	File Size	File Date	Check Sum
IRsolution.exe	Pass	Pass	Pass
1394Comm.dll	Pass	Pass	Pass
AIM8800R.dll	Pass	Pass	Pass
Aspipr32.dll	Pass	Pass	Pass
AtmosphereCorrectionR.dll	Pass	Pass	Pass
BasicR.dll	Pass	Pass	Pass
btreer.dll	Pass	Pass	Pass
ContainerManagerR.dll	Pass	Pass	Pass
ConvertLibsR.exe	Pass	Pass	Pass
DataExtractorR.dll	Pass	Pass	Pass
DpobjectR.dll	Pass	Pass	Pass
dpObjectXR.dll	Pass	Pass	Pass
Dpomathr.dll	Pass	Pass	Pass
dpoMathExR.dll	Pass	Pass	Pass
dpoMathExXR.dll	Pass	Pass	Pass
dpoMathFFTR.dll	Pass	Pass	Pass
dpoMathXR.dll	Pass	Pass	Pass
FTIR2000R.dll	Pass	Pass	Pass
FTIR8000R.dll	Pass	Pass	Pass
FTIRBaseR.dll	Pass	Pass	Pass
FTIRCM32.dll	Pass	Pass	Pass
GenToolsR.dll	Pass	Pass	Pass
GuiBasicR.dll	Pass	Pass	Pass
guiCalcR.dll	Pass	Pass	Pass
guiFilesR.dll	Pass	Pass	Pass
GuiSearchR.dll	Pass	Pass	Pass
IRCmd232.dll	Pass	Pass	Pass
IRCmd232U.dll	Pass	Pass	Pass
LabSolMngrR.dll	Pass	Pass	Pass
lcAccessFileR.dll	Pass	Pass	Pass
Lcadminr.dll	Pass	Pass	Pass
lcAdminXR.dll	Pass	Pass	Pass
lcHLAccessFileR.dll	Pass	Pass	Pass
lcInstrumentR.dll	Pass	Pass	Pass
LcmathexR.dll	Pass	Pass	Pass
LcmathR.dll	Pass	Pass	Pass
lcSerialPortR.dll	Pass	Pass	Pass
lcutilr.dll	Pass	Pass	Pass
MoleculeR.dll	Pass	Pass	Pass
ObjectToolsR.dll	Pass	Pass	Pass
ObjectViewerR.dll	Pass	Pass	Pass
og1220as.dll	Pass	Pass	Pass
ot1220as.dll	Pass	Pass	Pass
ParameterR.dll	Pass	Pass	Pass
PrintManagerR.dll	Pass	Pass	Pass
PrintManagerXR.dll	Pass	Pass	Pass
QuantR.dll	Pass	Pass	Pass
RWUXThemeS15.dll	Pass	Pass	Pass
SadtlerSearchR.dll	Pass	Pass	Pass
SCSIComm.dll	Pass	Pass	Pass

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===== Shimadzu LabSolutions Check the Program Files Report =====

SCSIPROT.DLL	Pass	Pass	Pass
SDBSDK.dll	Pass	Pass	Pass
SearchClientR.dll	Pass	Pass	Pass
SearchClientXR.dll	Pass	Pass	Pass
SearchR.dll	Pass	Pass	Pass
sfl1220as.dll	Pass	Pass	Pass
StingrayExtR.dll	Pass	Pass	Pass
SWDCalcR.dll	Pass	Pass	Pass
SZDropDownBtn.ocx	Pass	Pass	Pass
USBProt32.dll	Pass	Pass	Pass
UserManagementR.dll	Pass	Pass	Pass
WB9ENT.OCX	Pass	Pass	Pass
wgClassesR.dll	Pass	Pass	Pass
WinclassR.dll	Pass	Pass	Pass
WingraphR.dll	Pass	Pass	Pass
WinutilR.dll	Pass	Pass	Pass
WIRCmd232R.dll	Pass	Pass	Pass
wwb9@011.dll	Pass	Pass	Pass
wwb9@deu.dll	Pass	Pass	Pass
wwb9@esp.dll	Pass	Pass	Pass
wwb9@fra.dll	Pass	Pass	Pass
wwb9@ita.dll	Pass	Pass	Pass
wwb9@jpn.dll	Pass	Pass	Pass
wwb9@nor.dll	Pass	Pass	Pass
wwb9@ptb.dll	Pass	Pass	Pass
wwb9@rus.dll	Pass	Pass	Pass
wwb9@sve.dll	Pass	Pass	Pass
wwb9_32a.dll	Pass	Pass	Pass
wwb9_32w.dll	Pass	Pass	Pass
IRsolution.tlb	Pass	Pass	Pass
DataExtractorInfo.dll	Pass	Pass	Pass
IRLabSolUtl.dll	Pass	Pass	Pass
WideUse.dll	Pass	Pass	Pass
LabSolAssemblyLoader.dll	Pass	Pass	Pass
SecurityDLL.dll	Pass	Pass	Pass
DSCAP.ocx	Pass	Pass	Pass
IR_Agent.exe	Pass	Pass	Pass
Spectacle16R.dll	Pass	Pass	Pass
JcampR.dll	Pass	Pass	Pass
ASCIIR.dll	Pass	Pass	Pass
IRlauncher.exe	Pass	Pass	Pass
LabSolAssemblyLoader.dll	Pass	Pass	Pass
LibraryDecryptionAgent.dll	Pass	Pass	Pass
libDecryptLibrary.dll	Pass	Pass	Pass
libDecryptLibrary64.dll	Pass	Pass	Pass
libProtectionInfo.dll	Pass	Pass	Pass
libProtectionInfo64.dll	Pass	Pass	Pass
dd32.dll	Pass	Pass	Pass
dddbg64.dll	Pass	Pass	Pass
32870ASTM.icsq	Pass	Pass	Pass
32871JP.icsq	Pass	Pass	Pass
32872EP.icsq	Pass	Pass	Pass
32872USP.icsq	Pass	Pass	Pass
32873EasyScan.icsq	Pass	Pass	Pass
32874ReportViewer.icsq	Pass	Pass	Pass
32875PharmaReport.icsq	Pass	Pass	Pass
32877Identification.icsq	Pass	Pass	Pass
32878CHP.icsq	Pass	Pass	Pass
32879Compare.icsq	Pass	Pass	Pass
FMfromLauncher.icsq	Pass	Pass	Pass
FMfromProgram.icsq	Pass	Pass	Pass
32870ASTM.bas	Pass	Pass	Pass
32871JP.bas	Pass	Pass	Pass

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===== Shimadzu LabSolutions Check the Program Files Report =====

32872EP.bas	Pass	Pass	Pass
32872USP.bas	Pass	Pass	Pass
32873EasyScan.bas	Pass	Pass	Pass
32874ReportViewer.bas	Pass	Pass	Pass
32876FM.bas	Pass	Pass	Pass
32878CHP.bas	Pass	Pass	Pass
32879Compare.bas	Pass	Pass	Pass
IdentificationTest.bas	Pass	Pass	Pass
Kyokuhou.bas	Pass	Pass	Pass
FoodAdditive.bas	Pass	Pass	Pass
FMfromLauncher.bas	Pass	Pass	Pass
FMfromProgram.bas	Pass	Pass	Pass
SDBSecurityTool.exe	Pass	Pass	Pass
BRFiltersSDBSDK.dll	Pass	Pass	Pass
MacroTools3.exe	Pass	Pass	Pass
LabSolCppPack.dll	Pass	Pass	Pass
LabSolCppPackRes.dll	Pass	Pass	Pass
IRParamViewer.exe	Pass	Pass	Pass
RapidScanDataR.dll	Pass	Pass	Pass
AIMPointDataR.dll	Pass	Pass	Pass
RapidScanDataImport.dll	Pass	Pass	Pass
AIMPointDataImport.dll	Pass	Pass	Pass
OmnicR.dll	Pass	Pass	Pass
PerkinElmerR.dll	Pass	Pass	Pass
Shimadzu.SpectroCommon.Logging.dll	Pass	Pass	Pass
Shimadzu.SpectroCommon.Logging.Cli.dll	Pass	Pass	Pass
NLog.dll	Pass	Pass	Pass
NLog.license.txt	Pass	Pass	Pass
Livet.dll	Pass	Pass	Pass
Livet.xml	Pass	Pass	Pass
Microsoft.Expression.Interactions.dll	Pass	Pass	Pass
Shimadzu.ClearUI.Wpf.dll	Pass	Pass	Pass
SpectrumCheck.exe	Pass	Pass	Pass
SpectrumCheck.exe.config	Pass	Pass	Pass
System.Windows.Interactivity.dll	Pass	Pass	Pass
System.Windows.Interactivity.resources.dll	Pass	Pass	Pass
SpectrumCheck.resources.dll	Pass	Pass	Pass
SpectrumCheck.resources.dll	Pass	Pass	Pass
System.Windows.Interactivity.resources.dll	Pass	Pass	Pass

Program Name: Easy Macro
Version: 1.10
Date Checked: 28/11/2568 11:09:54(+07:00)
PC Information: Stand-alone PC(DESKTOP-5ULUA14)

File Name	File Size	File Date	Check Sum
emt.exe	Pass	Pass	Pass
emtXML.dll	Pass	Pass	Pass
emtResource.dll	Pass	Pass	Pass
emtInterface.dll	Pass	Pass	Pass
Interop.DATAEXTRACTORLib.dll	Pass	Pass	Pass
Interop.IRsolution.dll	Pass	Pass	Pass
MacroItemInfo.xml	Pass	Pass	Pass
MacroItemInfo.xsd	Pass	Pass	Pass
Arithmetic.bas	Pass	Pass	Pass
ATRCorrection.bas	Pass	Pass	Pass
AutoZero.bas	Pass	Pass	Pass
Baseline3Point.bas	Pass	Pass	Pass
BeginFrame.bas	Pass	Pass	Pass
BKGScan.bas	Pass	Pass	Pass
CloseContainer.bas	Pass	Pass	Pass
CloseContainer_bak.bas	Pass	Pass	Pass

เฉลิมชาติ

Printed by: System Administrator 28/11/2568 11:10:03

===== Shimadzu LabSolutions Check the Program Files Report =====

Connect.bas	Pass	Pass	Pass
Cut.bas	Pass	Pass	Pass
Derivative.bas	Pass	Pass	Pass
ExcuteBasic.bas	Pass	Pass	Pass
ExportContainer.bas	Pass	Pass	Pass
FrequencyConvert.bas	Pass	Pass	Pass
FrequencyConvert2.bas	Pass	Pass	Pass
FTIRInitialize.bas	Pass	Pass	Pass
KramersKronig.bas	Pass	Pass	Pass
Kubelka.bas	Pass	Pass	Pass
LaplaceInterpol.bas	Pass	Pass	Pass
MaxNormalize.bas	Pass	Pass	Pass
Mesure.bas	Pass	Pass	Pass
Normalize.bas	Pass	Pass	Pass
OpenContainer.bas	Pass	Pass	Pass
PeakPick.bas	Pass	Pass	Pass
PrintWithTemplate.bas	Pass	Pass	Pass
Purity.bas	Pass	Pass	Pass
QuantAnalyze.bas	Pass	Pass	Pass
Reduce.bas	Pass	Pass	Pass
SampleScan.bas	Pass	Pass	Pass
Save.bas	Pass	Pass	Pass
SaveAs.bas	Pass	Pass	Pass
SetParameterDetail.bas	Pass	Pass	Pass
SetParameterFile.bas	Pass	Pass	Pass
SetParameterMain.bas	Pass	Pass	Pass
Smooting.bas	Pass	Pass	Pass
SpectrumSearch.bas	Pass	Pass	Pass
PointPick.bas	Pass	Pass	Pass
Dataset.bas	Pass	Pass	Pass
AtmosphereCorrection.bas	Pass	Pass	Pass
AdvancedATRCorrection.bas	Pass	Pass	Pass
ValidationXML.bas	Pass	Pass	Pass

Total: Pass

เฉลิมชาติ

Printed by: System Administrator 28/11/2568 11:10:41

========== Shimadzu LabSolutions PC Information Report ==========

Computer Name: DESKTOP-5ULUA14
PC Type: Stand-alone PC

<<OS Information>>
Name: Microsoft Windows 11 Pro (64-bit)
Service Pack: -
Security Patch Information: Update (KB5056579)
Update (KB5064081)
Update (KB5064531)

<<PC Specification>>
CPU Model: Intel(R) Core(TM) Ultra 5 235 (14)
Physical Memory Size: 15826.75 MByte
Drive Name: C File System: NTFS Used/Capacity: 43.61/476.22 GByte
Drive Name: D File System: NTFS Used/Capacity: 1.61/476.82 GByte

<<Network>>
Domain/Workgroup Name: WORKGROUP
IP Address: fe80::98de:404:ebb8:3e84%6; 169.254.164.17
Subnet: 255.255.0.0
MAC Address: E8-CF-83-4E-AA-A1
Default Gateway:
DNS Server Address: 8.8.8.8
Use of DHCP: Enabled

<<Account Policy>>
Minimum Password Length: 0char
Minimum Password Age: 0days
Maximum Password Age: 42days
Enforce Password History: 0Passwords remembered
Password must meet complexity requirements: Disabled
Account Lockout Threshold: 10invalid logon attempts
Reset account lockout counter after: 10min
Account Lockout Duration: 10min
Store passwords using reversible encryption: Disabled

<<Audit Policy>>
Audit account management: No Auditing
Audit object access: No Auditing
Audit system events: No Auditing
Audit directory service access: No Auditing
Audit process tracking: No Auditing
Audit policy change: No Auditing
Audit logon events: No Auditing
Audit privilege use: No Auditing
Audit account logon events: No Auditing

<<User or Group with Permission of Changing the System Time>>
Name: Administrators
LOCAL SERVICE

<<Security Options>>
Interactive Logon: Do not require CTRL+ALT+DEL: Not Defined
Interactive Logon: Do not display last user name: Disabled

<<Others>>
Time Zone: SE Asia Standard Time

<<Software Version>>
LabSolutions IR: 2.34
LabSolutions Manager: 1.122

เฉลิมชาติ

Printed by: System Administrator 28/11/2568 11:10:41

========== Shimadzu LabSolutions PC Information Report ==========

<<Printer Information (Driver Information)>>
Microsoft Print to PDF (Microsoft Print To PDF)

เฉลิมชาติ

Test: measure S/N(/KRS-5 window

No.	S/N
1	88396.0
2	67663.7
3	91659.0
4	65159.5
5	67489.3
6	106821.1
7	65005.1
8	78736.8
9	67992.8
10	65692.2
Ave.	76461.6

Criteria: more than 42000:1

Determination OK

เพิ่มชาติ

Certified Reference Materials for UV, Visible, NIR and IR Molecular Spectroscopy

RM-1921/38

Set Serial 40776

Customer Details:

Bara Scientific Co. Ltd
U Chu Liang Building Floor 7
968 Rama 4 Road
Silom, Bangrak
Bangkok 10500
Thailand

The customer information stated on this page number 1, applies to all certificates.

Original Starna references are manufactured under ISO 17034:2016 accreditation

All calibration measurements are performed under ISO/IEC 17025:2017 accreditation.

UKAS REFERENCE MATERIALS 4001

เพิ่มชาติ

Reference Material Certificate of Calibration and Traceability

Polystyrene film (38 micron thick) mounted in a card holder for use as a wavenumber accuracy reference in the IR spectrum

Calibration Lab.
Starna Scientific Ltd
52/54 Fowler Rd
HAINAULT
Essex IG6 3UT
England
Tel. +44 (0) 20 8501 5550
Email: sales@starna.com

Reference Serial Number: 123840
Certificate Number: 111394
Certificate Date: 10/05/2023
Expiration Date: 10/05/2026
Set Serial Number: 40776
Analysis Number: IR111394123840

UKAS CALIBRATION
0659

Description of Reference Material:

This reference material consists of a flat polystyrene film which is mounted in a card holder to give a 25 mm circular measurement aperture.The reference material is designed for the verification and calibration of the wavenumber scales of FTIR spectrophotometers, and to meet the requirements of all major Pharmacopoeia (EP/JP/USP) for wavenumber and resolution control.

Certified Values of Reference Material:

The film is measured in the transmittance mode against an air blank, over the wavenumber range of 4000 to 400 cm-1. For each resolution, a baseline correction is performed with an empty cell holder. The fourteen primary transmittance minima are identified and certified to be within the expected wavenumber range tolerance for each resolution setting, as specified by the NIST reference control.

The combined analytical and instrument uncertainties at the 95 % confidence level (k=2) are shown below.

Wavenumber (cm-1)*	Expanded Uncertainty (U)
539.41	1.42
841.79	0.72
906.63	0.22
1028.27	0.18
1069.22	0.52
1154.50	0.12
1582.98	0.08
1601.29	0.12
1942.97	0.66
2849.48	0.30
3001.20	0.13
3025.99	0.32
3060.16	0.17
3082.26	0.14

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

The uncertainty evaluation has been carried out in accordance with UKAS requirements.

***NB: These wavenumber (cm-1) values are the internal certified reference values from NIST primary SRM 1921b - serial # 0213-3**

Resolution (cm-1)	Wavenumbers in cm-1 of peak minima as referenced to vacuum for Starna CRM serial # 123840
4.00	539.44
	841.71
	906.62
	1028.16
	1069.20
	1154.47
	1582.97
	1601.28
	1943.24
	2849.46
	3001.16
	3025.85
	3060.19
	3082.21

European Pharmacopoeia compliance
The difference between the absorption minima at 2870 cm-1 and the maxima at 2849.5 cm-1 is greater than 0.33 and the difference between the absorption minima at 1589 cm-1 and the maxima at 1583 cm-1 is greater than 0.08.

Japanese Pharmacopoeia compliance
The depth of the trough from the maximum absorption at about 2850 cm-1 to the minimum at about 2870 cm-1 is not less than 18% transmittance and that from the maximum at about 1583 cm-1 to the minimum at about 1589 cm-1 is not less than 12% transmittance.

US Pharmacopeia compliance
A wavenumber tolerance of +/- 1.0 cm-1 is allowed on the position of the following bands; 3060.0, 2849.5, 1942.9, 1601.2, 1583.0, 1154.5 and 1028.3 cm-1.

TGA Australia compliance
TGA allows the use of either BP/EP or USP as appropriate.

This certificate is issued in accordance with the laboratory accreditation requirements of the United Kingdom Accreditation Service. It provides traceability of measurement to the SI system of units and/or to units of measurement realised at the National Physical Laboratory or other recognised national metrology institutes. This certificate may not be reproduced other than in full, except with the prior written approval of the issuing laboratory.

Certifying Instrument Qualification:

All calibration is performed on an Avatar 380 reference spectrophotometer. The instrument is tested and confirmed toperform to the manufacturers written specification over the analytical range used for the reference material certification.

The following references and procedures are used in the quality performance procedures relating to the qualification of the spectrophotometer performance:

Wavenumber: NIST SRM 1921b, Polystyrene (Serial # 0213-3)

Calibration Method:

The conditions of analysis used to generate the certified values on this certificate are as listed in the chart below:

No. Of scans: 10 x 32
Resolution: 4 cm-1
Detector: DTGS KBr
Beamsplitter: KBr
Range: 4000 - 400 cm-1

Apodization: Happ-Genzel

Phase Correction: Mertz
Temperature: 23 +/- 1 ºC

Instructions for Use:

Using the above instrument settings, collect a background on air. Insert the sample in the film holder and repeat.

Repeat the measurement process at least six times.

Identify the reported transmittance minima and compare these to the certified minima shown.

If you find any significant differences, it is recommended that an approved manufacturer's representative inspects the instrument to determine the source of the difference.

Instrument Dependencies:

The instrument to be tested should have a resolution of 4 cm-1 or better. Consult the instrument owners handbook for this information.

Duration of Certificate:

This certification is valid for a maximum period of three years from the date of issue or sooner if specified by the user's own protocols.

Re-certification Procedure:

All reference materials are originally certified and supplied in a useable condition. There is no warranty for fitness beyond initial receipt by the customer.

When references need to be re-certified or inspected for any reason, customers should return them to the Starna ISO/IEC 17025 & 17034 accredited calibration laboratory, where all previous data are collated.

On receipt by Starna Scientific the references are measured "As Received" before cleaning under the re-certification procedure. "As received" data are available on request.

Storage and Care:

Reference (s) should always be stored in the box provided in a low-humidity environment e.g. FTIR sample compartment, desiccator, or similar 'dry' environment and handled with care. References are fragile and should be inserted and removed from the instrument taking care not to twist or apply leverage against the film holder.

Damage in the form of scratches or contamination may alter the certified values significantly such that they need re-certifying or even complete replacement.

Calibration performed by:

Calibration Technician - P. Wakelin RSci AMRSC

Approved Signatory:

Calibration Manager - A. Wakelin CSci CChem MRSC

This certificate is issued in accordance with the laboratory accreditation requirements of the United Kingdom Accreditation Service. It provides traceability of measurement to the SI system of units and/or to units of measurement realised at the National Physical Laboratory or other recognised national metrology institutes. This certificate may not be reproduced other than in full,

เฉลิมชาติ
ภาคผนวก ง-2 หน้า 29/139

Reference Material Certificate of Calibration and Traceability

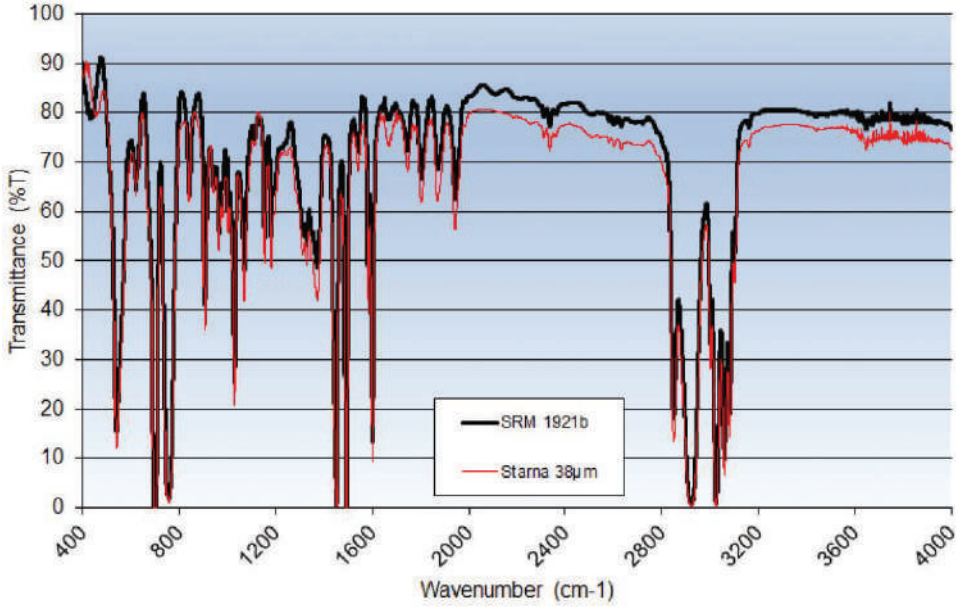
Polystyrene film (38 micron thick) mounted in a card holder for use as a wavenumber accuracy reference in the IR spectrum

Calibration Lab.
Starna Scientific Ltd
52/54 Fowler Rd
HAINAULT
Essex IG6 3UT
England
Tel. +44 (0) 20 8501 5550
Email: sales@starna.com

UKAS CALIBRATION
0659

Reference Serial Number: 123840
Certificate Number: 111394
Certificate Date: 10/05/2023
Expiration Date: 10/05/2026
Set Serial Number: 40776
Analysis Number: IR111394123840

Appendix A: Spectral Characteristics



This certificate is issued in accordance with the laboratory accreditation requirements of the United Kingdom Accreditation Service. It provides traceability of measurement to the SI system of units and/or to units of measurement realised at the National Physical Laboratory or other recognised national metrology institutes. This certificate may not be reproduced other than in full, except with the prior written approval of the issuing laboratory.

Bara Scientific
Solution of Success

Certificate of Attendance

This certificate is hereby awarded to

Mr. Chalermchat Kongthai

Bara Scientific Co., Ltd.

for having attended the

FTIR with Labsolutions IR Basic Service Training

conducted from 1st November to 24th November In the year 2023

held by BARA SCIENTIFIC CO., LTD.

given this day of 24th November 2023

Trained By :

Mr. Nut Bumrungwipusana
Senior Service Engineer, AA Group

Bara Scientific Co., Ltd.

Mr. Phoosak Hirunyatrakul
Managing Director

SHIMADZU

FM-SS-19 REV.00:03/03/2010

CA-ANALYTICAL-20231101124-0101

Certificate of System Qualification

GC-OQ + GCMS-OQ

System ID:	GC/MS 05/62
Organization Name:	S.P.S.Consulting Service Co.,Ltd.
Organization Location:	7 Soi Paholyothin 24 Bangok 10900
Date:	December 4, 2025 1:51:07 PM
EQP Name:	AgilentRecommended , AgilentRecommended
EQP Revision:	GC.02.50, GCMS.02.50
Overall Qualification Status:	Pass

System Inspection and Basic Safety and Operation

Name:	8890
Setpoint Status:	**Pass**

Overall System Inspection and Basic Safety and Operation Test Status

Pass

Inlet Pressure Decay

Name:	8890				
	Back	SSL			
Setpoint Status:	**Pass**				
Pressure:	25.0	psi			
Pressure Change:		-0.2	psi	/5 minutes	
Agilent Recommended:	>=	-2.0	and	<=	0.5

Overall Inlet Pressure Decay Test Status

Pass

Inlet Pressure Accuracy

Name:	8890			
	Back	SSL		
Setpoint Status:	**Pass**			
	Setpoint		Actual	
Inlet Pressure:	25.0	psi	25.0	psi
Accuracy:			0.0	psi
Agilent Recommended:			<= 1.2	

Overall Inlet Pressure Accuracy Test Status

Pass

Inlet Pressure Decay

Name:	8890				
	Front	SSL			
Setpoint Status:	**Pass**				
Pressure:	25.0	psi			
Pressure Change:		-0.1	psi	/5 minutes	
Agilent Recommended:	>=	-2.0	and	<=	0.5

Overall Inlet Pressure Decay Test Status

Pass

Inlet Pressure Accuracy

Name:	8890			
	Front	SSL		
Setpoint Status:	**Pass**			
	Setpoint		Actual	
Inlet Pressure:	25.0	psi	25.0	psi
Accuracy:			0.0	psi
Agilent Recommended:			<= 1.2	

Overall Inlet Pressure Accuracy Test Status

Pass

Detector Flow Accuracy

Name: 8890
Back FPD+

Setpoint Status: **Pass**

Flow Type: Fuel
Setpoint: 60.0 mL/min Measured Flow: 59.6 mL/min

Accuracy: 0.4 mL/min
Agilent Recommended: <= 10.0 % setpoint (6.0 ml/min)
Limit is percentage of setpoint or 0.5 ml/minute, whichever is largest.

Setpoint Status: **Pass**

Flow Type: Oxidizer
Setpoint: 60.0 mL/min Measured Flow: 59.7 mL/min

Accuracy: 0.3 mL/min
Agilent Recommended: <= 10.0 % setpoint (6.0 ml/min)
Limit is percentage of setpoint or 0.5 ml/minute, whichever is largest.

Setpoint Status: **Pass**

Flow Type: Makeup
Setpoint: 60.0 mL/min Measured Flow: 75 mL/min
Purge Offset: 20 % setpoint
Adjusted Setpoint: 72.00 mL/min

Accuracy: 3.0 mL/min
Agilent Recommended: <= 10.0 % setpoint (7.2 ml/min)
Limit is percentage of setpoint or 0.5 ml/minute, whichever is largest.

Overall Detector Flow Accuracy Test Status

Pass

Detector Flow Accuracy

Name: 8890
Front FID

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Setpoint Status: **Pass**

Flow Type: Fuel
Setpoint: 30.0 mL/min Measured Flow: 30.2 mL/min

Accuracy: 0.2 mL/min
Agilent Recommended: <= 10.0 % setpoint (3.0 ml/min)
Limit is percentage of setpoint or 0.5 ml/minute, whichever is largest.

Setpoint Status: **Pass**

Flow Type: Oxidizer
Setpoint: 400.0 mL/min Measured Flow: 396 mL/min

Accuracy: 4.0 mL/min
Agilent Recommended: <= 10.0 % setpoint (40.0 ml/min)
Limit is percentage of setpoint or 0.5 ml/minute, whichever is largest.

Setpoint Status: **Pass**

Flow Type: Makeup
Setpoint: 25.0 mL/min Measured Flow: 25.3 mL/min

Accuracy: 0.3 mL/min
Agilent Recommended: <= 10.0 % setpoint (2.5 ml/min)
Limit is percentage of setpoint or 0.5 ml/minute, whichever is largest.

Overall Detector Flow Accuracy Test Status

Pass

GC Oven Temperature Accuracy

Name: 8890

Setpoint Status:	**Pass**					
Zone:	Oven					
	Setpoint/Actual					
Temperature:	230.0	229.7	°C			
Accuracy:		-0.3	°C			
Agilent Recommended:	>=	-1.0	% setpoint in K	(	-5.0	°C)
	<=	1.0	% setpoint in K	(	5.0	°C)

Setpoint Status:	**Pass**					
Zone:	Oven					
	Setpoint/Actual					
Temperature:	100.0	99.8	°C			
Accuracy:		-0.2	°C			
Agilent Recommended:	>=	-1.0	% setpoint in K	(	-3.7	°C)
	<=	1.0	% setpoint in K	(	3.7	°C)

Overall GC Oven Temperature Accuracy Test Status

Pass

GC Oven Temperature Stability

Name:	8890		
Setpoint Status:	**Pass**		
	Setpoint/Average		
Temperature:	100.0	99.76667	°C
Stability:		0.1	°C
Agilent Recommended:	<=	0.5	

Overall GC Oven Temperature Stability Test Status

Pass

Scouting Run

Tested Combination1	Back	SSL	/ Back	FPD+	
	Manual Injection				
Name:	Not applicable				

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Setpoint Status:	**Completed**
Injection Volume on Column:	1.0 uL
Mode:	S-Mode

Overall Scouting Run Status

Completed

Noise and Drift

Tested Combination1	Back	SSL	/ Back	FPD+	
Name:	8890				

Setpoint Status:	**Pass**			
Mode:	S-Mode			
Base Signal:	65	150 pA		

		ASTM Noise Response		Drift Response/h
		20700.29		1944.69
Agilent Recommended:	<=	30720.00	<=	23040.00
Status:		Pass		Pass

Overall Noise and Drift Test Status

Pass

Signal to Noise

Tested Combination1	Back	SSL	/ Back	FPD+	
	Manual Injection				
Name:	8890				

Mode:	S-Mode	
Setpoint Status:	**Pass**	
Signal to Noise:		341448
Agilent Recommended:	>=	1400

Overall Signal to Noise Test Status

Pass

Scouting Run

Tested Combination2	Front Injection Tower	SSL	/ Front	FID
Name:	7693A			

Setpoint Status: **Completed**

Injection Volume on Column: 1.0 uL

Overall Scouting Run Status

Completed

Noise and Drift

Tested Combination2	Front	SSL	/ Front	FID
Name:	8890			

Setpoint Status: **Pass**

Base Signal: 11.5 pA

	ASTM Noise Response		Drift Response/h	
	284.49		2764.01	
Agilent Recommended:	<=	768.00	<=	19200.00
Status:	Pass		Pass	

Overall Noise and Drift Test Status

Pass

Injection Precision

Tested Combination2	Front	SSL	/ Front	FID
Name:	7693A			

Setpoint Status: **Pass**

Injection Volume on Column: 1.0 uL

Area RSD: 0.53 % Retention Time RSD: 0.03 %

Agilent Recommended: <= 3.00 <= 1.00

Overall Injection Precision Test Status

Pass

Signal to Noise

Tested Combination2	Front Injection Tower	SSL	/ Front	FID
Name:	8890			

Setpoint Status: **Pass**

Signal to Noise: 1101022

Agilent Recommended: >= 300000

Overall Signal to Noise Test Status

Pass

Log Amp

Tested Combination3	Front	SSL	/ External	SQ
Name:	5977B			

Setpoint Status: **Pass**

Overall Log Amp Test Status

Pass

RFPA

Tested Combination3	Front	SSL	/ External	SQ
Name:	5977B			

Setpoint Status: Pass

Amu:	1050	m/z	Drift After Five Minutes:	-9	mV	RFPA Voltage:	534	mV
Agilent Recommended:	>=	-100	and	<=	100	<=	1100	

Overall RFPA Test Status

Pass

Tune EI

Tested Combination3 Front SSL / External SQ

Name: 5977B

Setpoint Status: Pass

Filament: 1

Setpoint Status: Pass

Filament: 2

Overall Tune EI Test Status

Pass

Scouting Run

Tested Combination3 Front SSL / External SQ

Injection Tower

Name: 7693A

Source: EI - Inert

Setpoint Status: Completed

Injection Volume on Column: 1.0 uL

Overall Scouting Run Status

Completed

Instrument Detection Limit

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Tested Combination3 Front SSL / External SQ

Injection Tower

Name: 7693A

Source: EI - Inert

Setpoint Status: Pass

Injection Volume on Column: 1.0 uL

	Area	Retention Time
Minimum RSD:	3.54 %	0.02 %
Agilent Recommended:	<= 5.00	<= 1.00
Status:	Pass	Pass

Instrument Detection Limit: 1.18983 fg

Agilent Recommended: <= 1.68250

Status: Pass

Overall Instrument Detection Limit Test Status

Pass

Mass Ratio Precision

Tested Combination3 Front SSL / External SQ

Injection Tower

Name: 7693A

Source: EI - Inert

Setpoint Status: Pass

Injection Volume on Column: 1.0 uL

	Area Mass 1 Abundance*s	Mass Ratio
RSD:	0.34 %	0.16 %
Agilent Recommended:	<= 5.00	<= 5.00
	Pass	Pass

Overall Mass Ratio Precision Test Status

Pass

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Instrument Details

Purpose

This section describes the as found system configuration.

Details

System	
System ID	GC/MS 05/62
Manufacturer	Agilent Technologies
Name	8890
Tested Combination1	
Injection Technique	Manual Injection
Inlet	Back
Detector	Back
LTM Included?	No
Tested Combination2	
Injection Technique	Injection Tower
Inlet	Front
Detector	Front
LTM Included?	No
Tested Combination3	
Injection Technique	Injection Tower
Inlet	Front
Detector	External
LTM Included?	No
Sampler 1	
Manufacturer	Agilent Technologies
Type	Manual Injection
Usage	Sample Injection
Syringe Volume (µL)	10

Sampler 2

Manufacturer	Agilent Technologies
Type	Injection Tower
Name	7693A
Model Number	G4513A
Serial Number	CN19360205
Firmware Revision	A.11.03
Usage	Sample Injection
Location	Front
Syringe Volume (µL)	10

Sampler 3

Manufacturer	Agilent Technologies
Type	Tray
Name	7693A
Model Number	G4514A
Serial Number	CN19430060
Firmware Revision	A.11.03
Vial Heater	Not installed

Mainframe 1

Manufacturer	Agilent Technologies
Name	8890
Model Number	G3542A
Serial Number	CN1944A148
Firmware Revision	2.3.3.6
Oven Type	Standard

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Inlet 1

Manufacturer	Agilent Technologies
Name	8890
Type	SSL
Location	Front
Carrier Gas	Helium
Control Type	Electronic Pressure Control (EPC)
Purged Inlet	Yes

Inlet 2

Manufacturer	Agilent Technologies
Name	8890
Type	SSL
Location	Back
Carrier Gas	Helium
Control Type	Electronic Pressure Control (EPC)
Purged Inlet	Yes

Detector 1

Manufacturer	Agilent Technologies
Name	8890
Type	FID
Adapter	Capillary
Control Type	Electronic Pressure Control (EPC)
Location	Front
Makeup Gas	Nitrogen

Date: December 4, 2025 1:51:07 PM
System ID: GC/MS 05/62

Detector 2

Manufacturer	Agilent Technologies
Name	8890
Type	FPD+
Adapter	Capillary
Control Type	Electronic Pressure Control (EPC)
Location	Back
Makeup Gas	Nitrogen
First Filter Tested	S-Mode

Detector 3

Manufacturer	Agilent Technologies
Name	Mass Spectrometer
Type	Mass Spectrometer
Location	External

Mass Spectrometer 1

Manufacturer	Agilent Technologies
Type	SQ
Name	5977B
Serial Number	US1947M001
Firmware Revision	6.00.04
High Vacuum System	Turbo Pump
Scouting Run Standard	MRP Std

MS EI Source 1

Manufacturer	Agilent Technologies
Source Type	EI - Inert
Number of filaments	2

Electronic Signature

Purpose

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Details

Full Name of Signer:	Adirek Rattanawijit
Logged On User Name:	adirek.rattanawijit@non.agilent.com
Signature Creation Date:	December 4, 2025
Reason for Signature:	Executed protocol and published this original version of document

ACE Self Qualification Status

The installed version of ACE used to deliver this service passed qualification; the results conform with expected values. The self qualification summary report is available in the session folder location SDS\ClearStore\AceSelfQualification.

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User Name: adirek.rattanawijit
System Id: GC/MS 05/62
Report Generated by Hostname: C614-QA
Print Date: December 4, 2025 1:51:09 PM

SPS_OQGCMS_5977B_2025 Transaction log :

Time	Transaction State	Activity Performed	Type of Transaction	Optional Information
December 4, 2025 11:27:05 AM	Audit	SessionCreated	Session	Host Name: C614-QA, Drive Serial Number: 42776F5E
December 4, 2025 11:27:05 AM	start	Configuration	Session	None
December 4, 2025 11:27:05 AM	Audit	Entitlement	Licensing	User is Nonpaying and does not require an unlock code
December 4, 2025 11:39:42 AM	Audit	EqpLoaded	Session	EQP details for primary technique [Gc] - File path: [ProtocolPacks/Gc/Configurations/02.50/Gc.02.50.eqp], EQP File Name: [Gc.02.50.eqp], EQP Name: [AgilentRecommended],Protocol Revision :[Gc.02.50] EQP details for hyphenated technique [GcMs] - File path: [ProtocolPacks/GcMs/Configurations/02.50/GcMs.02.50.eqp], EQP File Name: [GcMs.02.50.eqp], EQP Name: [AgilentRecommended]
December 4, 2025 11:39:46 AM	End	Configuration	Session	None
December 4, 2025 11:39:58 AM	start	Qualification	Session	OQ
December 4, 2025 11:39:58 AM	start	Execution	System Inspection and Basic Safety and Operation - 8890: - Qualitative Test - No setpoints associated	None

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SPS_OQGCMS_5977B_2025 Transaction log :

Time	Transaction State	Activity Performed	Type of Transaction	Optional Information
December 4, 2025 11:40:47 AM	End	Execution	System Inspection and Basic Safety and Operation - 8890: - Qualitative Test - No setpoints associated	Run Count : 1
December 4, 2025 11:40:49 AM	start	Execution	Inlet Pressure Decay - Back SSL: - Pressure Controlled Inlet - S: 25.0 psi - L: >= -2.0 psi and <= 0.5 psi	None
December 4, 2025 11:41:04 AM	End	Execution	Inlet Pressure Decay - Back SSL: - Pressure Controlled Inlet - S: 25.0 psi - L: >= -2.0 psi and <= 0.5 psi	Run Count : 1
December 4, 2025 11:41:07 AM	start	Execution	Inlet Pressure Accuracy - Back SSL: - Pressure Controlled Inlet - S: 25.0 psi - L: <= 1.2 psi	None
December 4, 2025 11:41:20 AM	End	Execution	Inlet Pressure Accuracy - Back SSL: - Pressure Controlled Inlet - S: 25.0 psi - L: <= 1.2 psi	Run Count : 1
December 4, 2025 11:41:24 AM	start	Execution	Inlet Pressure Decay - Front SSL: - Pressure Controlled Inlet - S: 25.0 psi - L: >= -2.0 psi and <= 0.5 psi	None
December 4, 2025 11:41:36 AM	End	Execution	Inlet Pressure Decay - Front SSL: - Pressure Controlled Inlet - S: 25.0 psi - L: >= -2.0 psi and <= 0.5 psi	Run Count : 1
December 4, 2025 11:41:38 AM	start	Execution	Inlet Pressure Accuracy - Front SSL: - Pressure Controlled Inlet - S: 25.0 psi - L: <= 1.2 psi	None
December 4, 2025 11:41:42 AM	End	Execution	Inlet Pressure Accuracy - Front SSL: - Pressure Controlled Inlet - S: 25.0 psi - L: <= 1.2 psi	Run Count : 1

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SPS_OQGCMS_5977B_2025 Transaction log :

Time	Transaction State	Activity Performed	Type of Transaction	Optional Information
December 4, 2025 11:41:45 AM	start	Execution	Detector Flow Accuracy - Back FPD+: - Type : Fuel - S: 60.0 mL/min - L: <= 10.0% setpoint	None
December 4, 2025 11:42:04 AM	End	Execution	Detector Flow Accuracy - Back FPD+: - Type : Fuel - S: 60.0 mL/min - L: <= 10.0% setpoint	Run Count : 1
December 4, 2025 11:42:07 AM	start	Execution	Detector Flow Accuracy - Back FPD+: - Type : Oxidizer - S: 60.0 mL/min - L: <= 10.0% setpoint	None
December 4, 2025 11:42:14 AM	End	Execution	Detector Flow Accuracy - Back FPD+: - Type : Oxidizer - S: 60.0 mL/min - L: <= 10.0% setpoint	Run Count : 1
December 4, 2025 11:42:34 AM	start	Execution	Detector Flow Accuracy - Back FPD+: - Type : Makeup - S: 60.0 mL/min - L: <= 10.0% setpoint	None
December 4, 2025 11:42:40 AM	End	Execution	Detector Flow Accuracy - Back FPD+: - Type : Makeup - S: 60.0 mL/min - L: <= 10.0% setpoint	Run Count : 1
December 4, 2025 11:42:44 AM	start	Execution	Detector Flow Accuracy - Front FID: - Type : Fuel - S: 30.0 mL/min - L: <= 10.0% setpoint	None
December 4, 2025 11:42:59 AM	End	Execution	Detector Flow Accuracy - Front FID: - Type : Fuel - S: 30.0 mL/min - L: <= 10.0% setpoint	Run Count : 1
December 4, 2025 11:43:06 AM	start	Execution	Detector Flow Accuracy - Front FID: - Type : Oxidizer - S: 400.0 mL/min - L: <= 10.0% setpoint	None

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SPS_OQGCMS_5977B_2025 Transaction log :

Time	Transaction State	Activity Performed	Type of Transaction	Optional Information
December 4, 2025 11:43:11 AM	End	Execution	Detector Flow Accuracy - Front FID: - Type : Oxidizer - S: 400.0 mL/min - L: <= 10.0% setpoint	Run Count : 1
December 4, 2025 11:43:14 AM	start	Execution	Detector Flow Accuracy - Front FID: - Type : Makeup - S: 25.0 mL/min - L: <= 10.0% setpoint	None
December 4, 2025 11:43:55 AM	End	Execution	Detector Flow Accuracy - Front FID: - Type : Makeup - S: 25.0 mL/min - L: <= 10.0% setpoint	Run Count : 1
December 4, 2025 11:43:58 AM	start	Execution	GC Oven Temperature Accuracy - 8890: - Temperature : Oven - S: 230.0°C - L: >= -1.0 AND <= 1.0 % setpoint in K	None
December 4, 2025 11:44:33 AM	Audit	Data	GC Oven Temperature Accuracy - 8890: - Temperature : Oven - S: 230.0°C - L: >= -1.0 AND <= 1.0 % setpoint in K	Manual Data Entry
December 4, 2025 11:44:35 AM	End	Execution	GC Oven Temperature Accuracy - 8890: - Temperature : Oven - S: 230.0°C - L: >= -1.0 AND <= 1.0 % setpoint in K	Run Count : 1
December 4, 2025 11:44:38 AM	start	Execution	GC Oven Temperature Accuracy - 8890: - Temperature : Oven - S: 100.0°C - L: >= -1.0 AND <= 1.0 % setpoint in K	None
December 4, 2025 11:45:13 AM	Audit	Data	GC Oven Temperature Accuracy - 8890: - Temperature : Oven - S: 100.0°C - L: >= -1.0 AND <= 1.0 % setpoint in K	Manual Data Entry
December 4, 2025 11:45:15 AM	End	Execution	GC Oven Temperature Accuracy - 8890: - Temperature : Oven - S: 100.0°C - L: >= -1.0 AND <= 1.0 % setpoint in K	Run Count : 1

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SPS_OQGCMS_5977B_2025 Transaction log :

Time	Transaction State	Activity Performed	Type of Transaction	Optional Information
December 4, 2025 11:45:18 AM	start	Execution	GC Oven Temperature Stability - 8890: - Temperature : Oven - S: 100.0°C - L: <= 0.5°C	None
December 4, 2025 11:45:54 AM	start	Execution	GC Oven Temperature Stability - 8890: - Temperature : Oven - S: 100.0°C - L: <= 0.5°C	None
December 4, 2025 11:46:34 AM	Audit	Data	GC Oven Temperature Stability - 8890: - Temperature : Oven - S: 100.0°C - L: <= 0.5°C	Manual Data Entry
December 4, 2025 11:46:43 AM	End	Execution	GC Oven Temperature Stability - 8890: - Temperature : Oven - S: 100.0°C - L: <= 0.5°C	Run Count : 1
December 4, 2025 11:46:47 AM	start	Execution	GC Scouting Run - Manual Injection, Back SSL, Back FPD+: - Part of System Preparation - No limits associated	None
December 4, 2025 11:51:39 AM	Audit	Data	GC Scouting Run - Manual Injection, Back SSL, Back FPD+: - Part of System Preparation - No limits associated	Data files Path : C:\Users\Win 10 Home\Desktop\OQPV_GC\SPS OQPV_GCMS 2025\SCFPD02.D
December 4, 2025 11:52:01 AM	Audit	Data	DataManager	DataManager was in a data verification state but the user chose to start over
December 4, 2025 11:55:41 AM	Audit	Data	GC Scouting Run - Manual Injection, Back SSL, Back FPD+: - Part of System Preparation - No limits associated	Data files Path : C:\Users\Win 10 Home\Desktop\OQPV_GC\SPS OQPV_GCMS 2025\SCFPD03.D

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SPS_OQGCMS_5977B_2025 Transaction log :

Time	Transaction State	Activity Performed	Type of Transaction	Optional Information
December 4, 2025 11:55:53 AM	Audit	Reporting	Reintegration	Reintegration Count: 1 -- [Integration Type: Injection;Baseline Correction Mode: Advanced;Initial Slope Sensitivity: 10;Initial Peak Width: 0.01;Initial Area Reject: 0;Initial Height Reject: 100000;Integration: Off at 0;Integration: On at 7]
December 4, 2025 11:56:03 AM	Audit	Reporting	Reintegration	Reintegration Count: 2 -- [Integration Type: Injection;Baseline Correction Mode: Advanced;Initial Slope Sensitivity: 10;Initial Peak Width: 0.01;Initial Area Reject: 0;Initial Height Reject: 100000;Integration: Off at 0;Integration: On at 4]
December 4, 2025 11:57:54 AM	End	Execution	GC Scouting Run - Manual Injection, Back SSL, Back FPD+: - Part of System Preparation - No limits associated	Run Count : 1
December 4, 2025 11:57:59 AM	start	Execution	Signal to Noise - Manual Injection, Back SSL, Back FPD+: - Detector FPD+ - L: >= 1400	None
December 4, 2025 11:58:18 AM	Audit	Data	Signal to Noise - Manual Injection, Back SSL, Back FPD+: - Detector FPD+ - L: >= 1400	Data files Path : C:\Users\Win 10 Home\Desktop\OQPV_GC\SPS OQPV_GCMS 2025\SNFPD01.D

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SPS_OQGCMS_5977B_2025 Transaction log :

Time	Transaction State	Activity Performed	Type of Transaction	Optional Information
December 4, 2025 11:58:55 AM	Audit	Reporting	Reintegration	Reintegration Count: 1 -- [Integration Type: Injection;Baseline Correction Mode: Advanced;Initial Slope Sensitivity: 10;Initial Peak Width: 0.01;Initial Area Reject: 0;Initial Height Reject: 100000;Integration: Off at 0;Integration: On at 7]
December 4, 2025 11:59:04 AM	Audit	Reporting	Reintegration	Reintegration Count: 2 -- [Integration Type: Injection;Baseline Correction Mode: Advanced;Initial Slope Sensitivity: 10;Initial Peak Width: 0.01;Initial Area Reject: 0;Initial Height Reject: 100000;Integration: Off at 0;Integration: On at 2]
December 4, 2025 11:59:10 AM	Audit	Reporting	Reintegration	Reintegration Count: 3 -- [Integration Type: Injection;Baseline Correction Mode: Advanced;Initial Slope Sensitivity: 10;Initial Peak Width: 0.01;Initial Area Reject: 0;Initial Height Reject: 1000000;Integration: Off at 0;Integration: On at 2]
December 4, 2025 11:59:15 AM	Audit	Reporting	Reintegration	Reintegration Count: 4 -- [Integration Type: Injection;Baseline Correction Mode: Advanced;Initial Slope Sensitivity: 10;Initial Peak Width: 0.01;Initial Area Reject: 0;Initial Height Reject: 10000000;Integration: Off at 0;Integration: On at 2]

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Report Generated by Hostname: C614-QA
Print Date: December 4, 2025 1:51:09 PM

SPS_OQGCMS_5977B_2025 Transaction log :

Time	Transaction State	Activity Performed	Type of Transaction	Optional Information
December 4, 2025 11:59:20 AM	Audit	Reporting	Reintegration	Reintegration Count: 5 -- [Integration Type: Injection;Baseline Correction Mode: Advanced;Initial Slope Sensitivity: 10;Initial Peak Width: 0.01;Initial Area Reject: 0;Initial Height Reject: 100000000;Integration: Off at 0;Integration: On at 2]
December 4, 2025 11:59:24 AM	Audit	Reporting	Reintegration	Reintegration Count: 6 -- [Integration Type: Injection;Baseline Correction Mode: Advanced;Initial Slope Sensitivity: 10;Initial Peak Width: 0.01;Initial Area Reject: 0;Initial Height Reject: 1000000000;Integration: Off at 0;Integration: On at 2]
December 4, 2025 12:00:40 PM	End	Execution	Signal to Noise - Manual Injection, Back SSL, Back FPD+: - Detector FPD+ - L: >= 1400	Run Count : 1
December 4, 2025 12:00:48 PM	start	Execution	Noise and Drift - Back FPD+: - Detector FPD+ S-Mode - L (Noise): <= 4.00 150 pA - L (Drift): <= 3.00 150 pA/hour	None
December 4, 2025 12:02:17 PM	Audit	Data	Noise and Drift - Back FPD+: - Detector FPD+ S-Mode - L (Noise): <= 4.00 150 pA - L (Drift): <= 3.00 150 pA/hour	Data files Path : C:\Users\Win 10 Home\Desktop\OQPV_GC\SPS OQPV_GCMS 2025\OQ2025\ND003.D
December 4, 2025 12:02:24 PM	End	Execution	Noise and Drift - Back FPD+: - Detector FPD+ S-Mode - L (Noise): <= 4.00 150 pA - L (Drift): <= 3.00 150 pA/hour	Run Count : 1

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System Id: GC/MS 05/62
Report Generated by Hostname: C614-QA
Print Date: December 4, 2025 1:51:09 PM

SPS_OQGCMS_5977B_2025 Transaction log :

Time	Transaction State	Activity Performed	Type of Transaction	Optional Information
December 4, 2025 12:02:33 PM	start	Execution	GC Scouting Run - Injection Tower, Front SSL, Front FID: - Part of System Preparation - No limits associated	None
December 4, 2025 12:02:50 PM	Audit	Data	GC Scouting Run - Injection Tower, Front SSL, Front FID: - Part of System Preparation - No limits associated	Data files Path : C:\Users\Win 10 Home\Desktop\OQPV_GC\SPS OQPV_GCMS 2025\OQ2025\Scout_FID_001.D
December 4, 2025 12:03:11 PM	End	Execution	GC Scouting Run - Injection Tower, Front SSL, Front FID: - Part of System Preparation - No limits associated	Run Count : 1
December 4, 2025 12:03:14 PM	start	Execution	Noise and Drift - Front FID: - Detector FID - L (Noise): <= 0.10 pA - L (Drift): <= 2.50 pA/hour	None
December 4, 2025 12:03:26 PM	Audit	Data	Noise and Drift - Front FID: - Detector FID - L (Noise): <= 0.10 pA - L (Drift): <= 2.50 pA/hour	Data files Path : C:\Users\Win 10 Home\Desktop\OQPV_GC\SPS OQPV_GCMS 2025\OQ2025\ND002.D
December 4, 2025 12:03:31 PM	Audit	Data	DataManager	DataManager was in a data verification state but the user chose to start over
December 4, 2025 12:03:39 PM	Audit	Data	Noise and Drift - Front FID: - Detector FID - L (Noise): <= 0.10 pA - L (Drift): <= 2.50 pA/hour	Data files Path : C:\Users\Win 10 Home\Desktop\OQPV_GC\SPS OQPV_GCMS 2025\OQ2025\ND001.D
December 4, 2025 12:03:52 PM	End	Execution	Noise and Drift - Front FID: - Detector FID - L (Noise): <= 0.10 pA - L (Drift): <= 2.50 pA/hour	Run Count : 1

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SPS_OQGCMS_5977B_2025 Transaction log :

Time	Transaction State	Activity Performed	Type of Transaction	Optional Information
December 4, 2025 12:03:56 PM	start	Execution	Injection Precision - Injection Tower, Front SSL, Front FID: - GC - L (Area): <= 3.00% - L (Ret. Time): <= 1.00%	None
December 4, 2025 12:04:15 PM	Audit	Data	Injection Precision - Injection Tower, Front SSL, Front FID: - GC - L (Area): <= 3.00% - L (Ret. Time): <= 1.00%	Data files Path : C:\Users\Win 10 Home\Desktop\OQPV_GC\SPS OQPV_GCMS 2025\OQ2025\IP_FID_002.D
December 4, 2025 12:04:15 PM	Audit	Data	Injection Precision - Injection Tower, Front SSL, Front FID: - GC - L (Area): <= 3.00% - L (Ret. Time): <= 1.00%	Data files Path : C:\Users\Win 10 Home\Desktop\OQPV_GC\SPS OQPV_GCMS 2025\OQ2025\IP_FID_003.D
December 4, 2025 12:04:15 PM	Audit	Data	Injection Precision - Injection Tower, Front SSL, Front FID: - GC - L (Area): <= 3.00% - L (Ret. Time): <= 1.00%	Data files Path : C:\Users\Win 10 Home\Desktop\OQPV_GC\SPS OQPV_GCMS 2025\OQ2025\IP_FID_004.D
December 4, 2025 12:04:15 PM	Audit	Data	Injection Precision - Injection Tower, Front SSL, Front FID: - GC - L (Area): <= 3.00% - L (Ret. Time): <= 1.00%	Data files Path : C:\Users\Win 10 Home\Desktop\OQPV_GC\SPS OQPV_GCMS 2025\OQ2025\IP_FID_005.D
December 4, 2025 12:04:15 PM	Audit	Data	Injection Precision - Injection Tower, Front SSL, Front FID: - GC - L (Area): <= 3.00% - L (Ret. Time): <= 1.00%	Data files Path : C:\Users\Win 10 Home\Desktop\OQPV_GC\SPS OQPV_GCMS 2025\OQ2025\IP_FID_006.D
December 4, 2025 12:04:15 PM	Audit	Data	Injection Precision - Injection Tower, Front SSL, Front FID: - GC - L (Area): <= 3.00% - L (Ret. Time): <= 1.00%	Data files Path : C:\Users\Win 10 Home\Desktop\OQPV_GC\SPS OQPV_GCMS 2025\OQ2025\IP_FID_007.D

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SPS_OQGCMS_5977B_2025 Transaction log :

Time	Transaction State	Activity Performed	Type of Transaction	Optional Information
December 4, 2025 12:04:31 PM	End	Execution	Injection Precision - Injection Tower, Front SSL, Front FID: - GC - L (Area): <= 3.00% - L (Ret. Time): <= 1.00%	Run Count : 1
December 4, 2025 12:04:35 PM	start	Execution	Signal to Noise - Injection Tower, Front SSL, Front FID: - Detector FID - L: >= 300000	None
December 4, 2025 12:05:00 PM	Audit	Data	Signal to Noise - Injection Tower, Front SSL, Front FID: - Detector FID - L: >= 300000	Data files Path : C:\Users\Win 10 Home\Desktop\OQPV_GC\SPS OQPV_GCMS 2025\OQ2025\SN_FID_001.D
December 4, 2025 12:05:10 PM	End	Execution	Signal to Noise - Injection Tower, Front SSL, Front FID: - Detector FID - L: >= 300000	Run Count : 1
December 4, 2025 12:05:17 PM	start	Execution	Log Amp - 5977B SQ: - Source: EI - Inert	None
December 4, 2025 12:09:24 PM	start	Execution	RFPA - 5977B SQ: - Source: EI - Inert	None
December 4, 2025 12:19:06 PM	End	Execution	RFPA - 5977B SQ: - Source: EI - Inert	Run Count : 1
December 4, 2025 12:21:23 PM	start	Execution	Scouting Run - Injection Tower, Front SSL, SQ: - Source: - EI - Inert- Part of GCMS System Preparation	None
December 4, 2025 12:21:38 PM	Audit	Data	Scouting Run - Injection Tower, Front SSL, SQ: - Source: - EI - Inert- Part of GCMS System Preparation	Data files Path : C:\Users\Win 10 Home\Desktop\OQPV_GC\SPS OQPV_GCMS 2025\OQ2025\SC01.D

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SPS_OQGCMS_5977B_2025 Transaction log :

Time	Transaction State	Activity Performed	Type of Transaction	Optional Information
December 4, 2025 12:21:54 PM	start	Execution	Instrument Detection Limit - Injection Tower, Front SSL, SQ: - Source: - EI - Inert - RSD L (Area): <= 5.00% - RSD L (Ret. Time): <= 1.00%	None
December 4, 2025 12:22:29 PM	Audit	Data	Instrument Detection Limit - Injection Tower, Front SSL, SQ: - Source: - EI - Inert - RSD L (Area): <= 5.00% - RSD L (Ret. Time): <= 1.00%	Data files Path : C:\Users\Win 10 Home\Desktop\OQPV_GC\SPS OQPV_GCMS 2025\OQ2025\IDL002.D
December 4, 2025 12:22:29 PM	Audit	Data	Instrument Detection Limit - Injection Tower, Front SSL, SQ: - Source: - EI - Inert - RSD L (Area): <= 5.00% - RSD L (Ret. Time): <= 1.00%	Data files Path : C:\Users\Win 10 Home\Desktop\OQPV_GC\SPS OQPV_GCMS 2025\OQ2025\IDL003.D
December 4, 2025 12:22:29 PM	Audit	Data	Instrument Detection Limit - Injection Tower, Front SSL, SQ: - Source: - EI - Inert - RSD L (Area): <= 5.00% - RSD L (Ret. Time): <= 1.00%	Data files Path : C:\Users\Win 10 Home\Desktop\OQPV_GC\SPS OQPV_GCMS 2025\OQ2025\IDL004.D
December 4, 2025 12:22:29 PM	Audit	Data	Instrument Detection Limit - Injection Tower, Front SSL, SQ: - Source: - EI - Inert - RSD L (Area): <= 5.00% - RSD L (Ret. Time): <= 1.00%	Data files Path : C:\Users\Win 10 Home\Desktop\OQPV_GC\SPS OQPV_GCMS 2025\OQ2025\IDL005.D
December 4, 2025 12:22:29 PM	Audit	Data	Instrument Detection Limit - Injection Tower, Front SSL, SQ: - Source: - EI - Inert - RSD L (Area): <= 5.00% - RSD L (Ret. Time): <= 1.00%	Data files Path : C:\Users\Win 10 Home\Desktop\OQPV_GC\SPS OQPV_GCMS 2025\OQ2025\IDL006.D
December 4, 2025 12:22:29 PM	Audit	Data	Instrument Detection Limit - Injection Tower, Front SSL, SQ: - Source: - EI - Inert - RSD L (Area): <= 5.00% - RSD L (Ret. Time): <= 1.00%	Data files Path : C:\Users\Win 10 Home\Desktop\OQPV_GC\SPS OQPV_GCMS 2025\OQ2025\IDL007.D

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December 4, 2025 12:22:29 PM	Audit	Data	Instrument Detection Limit - Injection Tower, Front SSL, SQ: - Source: - EI - Inert - RSD L (Area): <= 5.00% - RSD L (Ret. Time): <= 1.00%	Data files Path : C:\Users\Win 10 Home\Desktop\OQPV_GC\SPS OQPV_GCMS 2025\OQ2025\IDL008.D
December 4, 2025 12:22:29 PM	Audit	Data	Instrument Detection Limit - Injection Tower, Front SSL, SQ: - Source: - EI - Inert - RSD L (Area): <= 5.00% - RSD L (Ret. Time): <= 1.00%	Data files Path : C:\Users\Win 10 Home\Desktop\OQPV_GC\SPS OQPV_GCMS 2025\OQ2025\IDL009.D
December 4, 2025 12:22:29 PM	Audit	Data	Instrument Detection Limit - Injection Tower, Front SSL, SQ: - Source: - EI - Inert - RSD L (Area): <= 5.00% - RSD L (Ret. Time): <= 1.00%	Data files Path : C:\Users\Win 10 Home\Desktop\OQPV_GC\SPS OQPV_GCMS 2025\OQ2025\IDL010.D
December 4, 2025 12:22:29 PM	Audit	Data	Instrument Detection Limit - Injection Tower, Front SSL, SQ: - Source: - EI - Inert - RSD L (Area): <= 5.00% - RSD L (Ret. Time): <= 1.00%	Data files Path : C:\Users\Win 10 Home\Desktop\OQPV_GC\SPS OQPV_GCMS 2025\OQ2025\IDL011.D
December 4, 2025 12:22:54 PM	Audit	Reporting	Reintegration	Reintegration Count: 1 -- [Integration Type: Injection;Baseline Correction Mode: Advanced;Initial Slope Sensitivity: 10;Initial Peak Width: 0.01;Initial Area Reject: 0;Initial Height Reject: 50;Integration: Off at 0;Integration: On at 4.5]
December 4, 2025 12:23:13 PM	End	Execution	Instrument Detection Limit - Injection Tower, Front SSL, SQ: - Source: - EI - Inert - RSD L (Area): <= 5.00% - RSD L (Ret. Time): <= 1.00%	Run Count : 1

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User Name: adirek.rattanawijit
System Id: GC/MS 05/62
Report Generated by Hostname: C614-QA
Print Date: December 4, 2025 1:51:09 PM

SPS_OQGCMS_5977B_2025 Transaction log :

Time	Transaction State	Activity Performed	Type of Transaction	Optional Information
December 4, 2025 12:23:20 PM	start	Execution	Scouting Run - Injection Tower, Front SSL, SQ: - Source: - EI - Inert- Part of GCMS System Preparation	None
December 4, 2025 12:23:30 PM	start	Execution	Scouting Run - Injection Tower, Front SSL, SQ: - Source: - EI - Inert- Part of GCMS System Preparation	None
December 4, 2025 12:25:04 PM	End	Execution	Scouting Run - Injection Tower, Front SSL, SQ: - Source: - EI - Inert- Part of GCMS System Preparation	Run Count : 1
December 4, 2025 12:25:08 PM	start	Execution	Mass Ratio Precision - Injection Tower, Front SSL, SQ: - Source: EI - Inert - L (RSD): <= 5.00%	None
December 4, 2025 12:25:31 PM	Audit	Data	Mass Ratio Precision - Injection Tower, Front SSL, SQ: - Source: EI - Inert - L (RSD): <= 5.00%	Data files Path : C:\Users\Win 10 Home\Desktop\OQPV_GC\SPS OQPV_GCMS 2025\OQ2025\MRP002.D
December 4, 2025 12:25:31 PM	Audit	Data	Mass Ratio Precision - Injection Tower, Front SSL, SQ: - Source: EI - Inert - L (RSD): <= 5.00%	Data files Path : C:\Users\Win 10 Home\Desktop\OQPV_GC\SPS OQPV_GCMS 2025\OQ2025\MRP003.D
December 4, 2025 12:25:31 PM	Audit	Data	Mass Ratio Precision - Injection Tower, Front SSL, SQ: - Source: EI - Inert - L (RSD): <= 5.00%	Data files Path : C:\Users\Win 10 Home\Desktop\OQPV_GC\SPS OQPV_GCMS 2025\OQ2025\MRP004.D

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User Name: adirek.rattanawijit
Report Generated by Hostname: C614-QA
System Id: GC/MS 05/62
Print Date: December 4, 2025 1:51:09 PM

SPS_OQGCMS_5977B_2025 Transaction log :

Time	Transaction State	Activity Performed	Type of Transaction	Optional Information
December 4, 2025 12:25:31 PM	Audit	Data	Mass Ratio Precision - Injection Tower, Front SSL, SQ: - Source: EI - Inert - L (RSD): <= 5.00%	Data files Path : C:\Users\Win 10 Home\Desktop\OQPV_GC\SPS OQPV_GCMS 2025\OQ2025\MRP005.D
December 4, 2025 12:25:31 PM	Audit	Data	Mass Ratio Precision - Injection Tower, Front SSL, SQ: - Source: EI - Inert - L (RSD): <= 5.00%	Data files Path : C:\Users\Win 10 Home\Desktop\OQPV_GC\SPS OQPV_GCMS 2025\OQ2025\MRP006.D
December 4, 2025 12:25:31 PM	Audit	Data	Mass Ratio Precision - Injection Tower, Front SSL, SQ: - Source: EI - Inert - L (RSD): <= 5.00%	Data files Path : C:\Users\Win 10 Home\Desktop\OQPV_GC\SPS OQPV_GCMS 2025\OQ2025\MRP007.D
December 4, 2025 12:25:47 PM	Audit	Reporting	Reintegration	Reintegration Count: 1 -- [Integration Type: Injection;Baseline Correction Mode: Advanced;Initial Slope Sensitivity: 10;Initial Peak Width: 0.01;Initial Area Reject: 0;Initial Height Reject: 50000;Integration: Off at 0;Integration: On at 4.6]
December 4, 2025 12:26:01 PM	End	Execution	Mass Ratio Precision - Injection Tower, Front SSL, SQ: - Source: EI - Inert - L (RSD): <= 5.00%	Run Count : 1
December 4, 2025 1:31:04 PM	start	Execution	Log Amp - 5977B SQ: - Source: EI - Inert	None
December 4, 2025 1:32:04 PM	End	Execution	Log Amp - 5977B SQ: - Source: EI - Inert	Run Count : 1
December 4, 2025 1:33:18 PM	start	Execution	Tune EI - 5977B SQ: - Source: - EI - Inert Filament 1 (Qualitative - No setpoints associated)	None

User Name: adirek.rattanawijit
Report Generated by Hostname: C614-QA
System Id: GC/MS 05/62
Print Date: December 4, 2025 1:51:09 PM

SPS_OQGCMS_5977B_2025 Transaction log :

Time	Transaction State	Activity Performed	Type of Transaction	Optional Information
December 4, 2025 1:33:38 PM	End	Execution	Tune EI - 5977B SQ: - Source: - EI - Inert Filament 1 (Qualitative - No setpoints associated)	Run Count : 1
December 4, 2025 1:33:41 PM	start	Execution	Tune EI - 5977B SQ: - Source: - EI - Inert Filament 2 (Qualitative - No setpoints associated)	None
December 4, 2025 1:33:59 PM	End	Execution	Tune EI - 5977B SQ: - Source: - EI - Inert Filament 2 (Qualitative - No setpoints associated)	Run Count : 1
December 4, 2025 1:34:04 PM	End	Qualification	Session	OQ
December 4, 2025 1:34:04 PM	start	Reporting	Session	None
December 4, 2025 1:46:22 PM	Audit	Reporting	Session	Report Generated : Certificate
December 4, 2025 1:47:02 PM	Audit	Reporting	Session	Report Generated : Report
December 4, 2025 1:47:58 PM	Audit	AceClosed	Session	None
December 4, 2025 1:48:35 PM	Audit	AceRestarted	Session	Host Name: C614-QA, Drive Serial Number: 42776F5E
December 4, 2025 1:48:38 PM	Audit	SessionReloaded	Session	None
December 4, 2025 1:48:42 PM	start	Qualification	Session	OQ
December 4, 2025 1:49:52 PM	Audit	Reporting	Session	Report Generated : Certificate
December 4, 2025 1:50:32 PM	Audit	Reporting	Session	Report Generated : Report

ระดับเสียงในบรรยากาศ

THAILAND INSTITUTE OF SCIENTIFIC AND TECHNOLOGICAL RESEARCH (TISTR)

Request No. 21-68/0220 **MTC No.** EEL. BP. 44/0268

CALIBRATION CERTIFICATE

Submitted by : S.P.S.Consulting Service Co.,Ltd.

Address : 7 Soi Phaholyothin 24, Phaholyothin Road, Jompol, 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 Panasonic VP-7722A S/N 041477D122.
7. Condenser Microphone B&K 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 : 19 Feb. 2025

Date of Calibration : 21 Feb. 2025

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.

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

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Bangkok 10900, Thailand
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(66) 08 1889 6827

THAILAND INSTITUTE OF SCIENTIFIC AND TECHNOLOGICAL RESEARCH (TISTR)

Request No. 21-68/0220 **MTC No.** EEL. BP. 44/0268

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	93.81	-0.19	± 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	0.95	± 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 : .....

(Mr.Weerachai Deechaiyae)

Approved by : .....

(Mr.Prawate Kluaypa)

Director

Electrical and Electronic Standards Laboratory

Industrial Metrology and Testing Service Centre

Date of Calibration : 21 Feb. 2025

Date of Issue : 24 Feb. 2025

Ref : 20112680219007390001

End of Certificate

2 / 2

The results relate only to the items tested/calibrated or value assigned.
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บริษัท เอส.พี.เอส. คอนซัลติ้ง เซอร์วิส จำกัด
S.P.S. CONSULTING SERVICE CO., LTD.
7 ซอยพหลโยธิน 24 ถนนพหลโยธิน แขวงลาดยาว 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

Noise B_533/25

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	21 February 2025
		Due Date	21 February 2026

Calibration Data

Sound Level Meter Data				Calibration Data		
					Actual Reading [dB]	
SLM No.	Brand	Model	Serial No.	Date	Before Adjustment	After Adjustment
ACO-B32	ACO	6236	00182014	02 November 2025	93.9	93.9
ACO-B38	ACO	6236	00192029	02 November 2025	93.9	93.9
ACO-B42	ACO	6236	00192033	02 November 2025	93.8	93.9
Acoustic Certified Value : Thailand Institute of Scientific and Technological Research (TISTR)					93.81 ± 0.10 dB	

Calibrated by : Adul Dangklom
(Mr. Adul Dangklom)

Approved by :
(Mr. Peera Detudom)

คุณภาพอากาศจากปล่อง

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Console Calibration Report

Calibration Method	Critical Orifices

Calibration Data

Console Data		Calibration Data		
No.	Serial No.	Date	y	$\Delta H_@$ (mmH_2O)
B01	1563	05/09/2025	1.004	49.67
B02	8002514	01/09/2025	1.002	49.85
B03	1503016	01/09/2025	1.005	49.77
B04	00006659	04/09/2025	0.997	49.93
B05	00007428	02/09/2025	1.003	49.51
R01	1561	01/09/2025	0.999	49.82
R02	8002513	01/09/2025	0.996	49.94
R03	1570	04/09/2025	0.998	50.02
R04	8002519	04/09/2025	1.002	49.89
R05	1503015	02/09/2025	0.996	50.10

Remark : Accept Value of y (test) is $0.97 < y < 1.03$

Accept Value of $\Delta H_@$ (test) is 46.7 ± 6.4 (mmH_2O)

Calibrated by :	Approved by :
Adul Dangklom	
(Mr. Adul Dangklom)	(Mr. Peera Detudom)

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

Pitot Tube Calibration Report

Calibration Method	Standard Pitot Tube

Calibration Data

Pitot Tube Data			Calibration Data		
No.	Type of Pitot	Coefficience of Standard Pitot	Date	Avg. of Cp (test) Side A	Avg. of Cp (test) Side B
B03	S	0.99	04/08/2025	0.84	0.84
B04	S	0.99	01/08/2025	0.84	0.83
B05	S	0.99	01/08/2025	0.84	0.84
B07	S	0.99	04/08/2025	0.85	0.84
B08	S	0.99	01/08/2025	0.84	0.84
, B09	S	0.99	04/08/2025	0.84	0.83
B11	S	0.99	05/08/2025	0.84	0.84
B16	S	0.99	04/08/2025	0.84	0.83
B18	S	0.99	01/08/2025	0.84	0.84
B19	S	0.99	01/08/2025	0.84	0.83
B21	S	0.99	04/08/2025	0.84	0.83
B24	S	0.99	01/08/2025	0.84	0.84
B27	S	0.99	04/08/2025	0.84	0.83
B30	S	0.99	01/08/2025	0.85	0.84
B31	S	0.99	01/08/2025	0.84	0.85
B33	S	0.99	01/08/2025	0.83	0.84
B35	S	0.99	01/08/2025	0.84	0.85

Remark : Accept value of Cp (test) is 0.84 ± 0.01

Calibrated by :	Approved by :
Adul Dangklom (Mr. Adul Dangklom)	(Mr. Peera Detudom)

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

Pitot Tube Calibration Report

Calibration Method	Standard Pitot Tube

Calibration Data

Pitot Tube Data			Calibration Data		
No.	Type of Pitot	Coefficience of Standard Pitot	Date	Avg. of Cp (test) Side A	Avg. of Cp (test) Side B
B36	S	0.99	01/08/2025	0.84	0.84
B37	S	0.99	01/08/2025	0.84	0.85
B38	S	0.99	01/08/2025	0.84	0.83
B39	S	0.99	01/08/2025	0.84	0.84
B40	S	0.99	04/08/2025	0.85	0.84
B41	S	0.99	01/08/2025	0.84	0.84
B44	S	0.99	05/08/2025	0.83	0.84
B45	S	0.99	01/08/2025	0.84	0.85
B46	S	0.99	01/08/2025	0.85	0.84
B47	S	0.99	01/08/2025	0.85	0.84
B48	S	0.99	01/08/2025	0.84	0.84
B49	S	0.99	04/08/2025	0.85	0.84
B54	S	0.99	01/08/2025	0.84	0.84
B56	S	0.99	04/08/2025	0.84	0.84
B57	S	0.99	04/08/2025	0.85	0.84
B58	S	0.99	04/08/2025	0.84	0.84

Remark : Accept value of Cp (test) is 0.84 ± 0.01

Calibrated by :	Approved by :
Adul Dangklom (Mr. Adul Dangklom)	(Mr. Peera Detudom)

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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) Setting			Actual (Q std.)			Value From Calibration Curve	
					1	2	3	1	2	3	y	R^2
B01	SKC	224-PCXR4	262101	03/10/2025	1,000	1,500	2,000	998	1,490	1,997	1.000x - 7.191	1.000
B02	SKC	224-PCXR4	626166	03/10/2025	1,000	1,500	2,000	1,007	1,500	2,008	0.999x + 2.537	1.000
B03	SKC	224-PCXR4	612968	03/10/2025	1,000	1,500	2,000	1,003	1,503	2,001	0.997x + 0.810	0.999
B04	SKC	224-PCXR4	602804	02/10/2025	1,000	1,500	2,000	998	1,494	1,993	1.001x - 6.035	1.000
B05	SKC	224-PCXR4	612693	02/10/2025	1,000	1,500	2,000	999	1,495	2,001	0.999x - 2.481	1.000
B06	SKC	224-PCXR4	262188	02/10/2025	1,000	1,500	2,000	997	1,510	2,000	0.998x + 0.064	0.999
B07	SKC	224-PCXR4	626262	01/10/2025	1,000	1,500	2,000	1,004	1,492	2,007	1.002x - 4.778	1.000
B08	SKC	224-PCXR4	626100	02/10/2025	1,000	1,500	2,000	1,005	1,500	2,005	1.004x - 7.223	1.000
B09	SKC	224-PCXR4	626479	01/10/2025	1,000	1,500	2,000	1,001	1,501	1,986	0.996x + 3.462	0.999
B10	SKC	224-PCXR4	091950	01/10/2025	1,000	1,500	2,000	997	1,504	2,000	1.003x - 8.822	1.000
B11	SKC	224-PCXR8	564315	03/10/2025	1,000	1,500	2,000	1,001	1,503	1,995	0.995x + 2.449	1.000
B12	SKC	224-PCXR4	034656	03/10/2025	1,000	1,500	2,000	997	1,506	2,003	1.003x - 9.062	0.999
B13	SKC	224-PCXR4	602073	03/10/2025	1,000	1,500	2,000	1,003	1,497	2,006	1.002x - 5.013	1.000
B14	SKC	224-PCXR4	626313	03/10/2025	1,000	1,500	2,000	998	1,501	1,992	1.005x - 11.702	0.999
B15	SKC	224-PCXR4	626474	03/10/2025	1,000	1,500	2,000	1,001	1,502	2,004	1.006x - 11.694	1.000
B16	SKC	224-PCXR4	626477	03/10/2025	1,000	1,500	2,000	996	1,498	1,992	1.007x - 16.329	0.999
B17	SKC	224-PCXR4	626860	02/10/2025	1,000	1,500	2,000	1,001	1,503	1,998	1.001x - 4.838	1.000
B18	SKC	224-PCXR4	691484	01/10/2025	1,000	1,500	2,000	997	1,514	1,996	0.996x + 5.360	1.000
B19	SKC	224-PCXR4	691599	01/10/2025	1,000	1,500	2,000	998	1,499	2,003	0.998x + 0.399	1.000
B20	SKC	224-PCXR4	691587	01/10/2025	1,000	1,500	2,000	1,001	1,501	1,999	0.995x + 1.520	0.999
B21	SKC	224-PCXR4	691531	03/10/2025	1,000	1,500	2,000	996	1,502	2,001	1.003x - 7.151	1.000
B22	SKC	224-PCXR4	691654	03/10/2025	1,000	1,500	2,000	1,001	1,500	1,998	0.997x - 0.666	1.000
B23	SKC	224-PCXR4	798393	03/10/2025	1,000	1,500	2,000	993	1,507	1,999	1.007x - 17.505	0.999
B24	SKC	224-PCXR4	626363	03/10/2025	1,000	1,500	2,000	994	1,498	1,995	1.000x - 3.941	1.000
B25	SKC	224-PCXR4	798489	01/10/2025	1,000	1,500	2,000	1,003	1,490	2,001	0.997x + 1.703	1.000
B26	SKC	224-PCXR4	798479	01/10/2025	1,000	1,500	2,000	1,001	1,509	1,995	1.002x - 8.057	0.999
B27	SKC	224-PCXR4	691673	01/10/2025	1,000	1,500	2,000	998	1,510	2,002	1.005x - 9.656	1.000
B28	SKC	224-PCXR4	691570	01/10/2025	1,000	1,500	2,000	1,011	1,508	2,009	0.999x + 3.729	0.999
B29	SKC	224-PCXR4	626472	01/10/2025	1,000	1,500	2,000	1,002	1,503	1,998	1.002x - 6.066	1.000
B30	SKC	224-PCXR4	691489	01/10/2025	1,000	1,500	2,000	997	1,506	2,001	1.004x - 8.049	1.000
B31	SKC	224-PCXR4	691509	02/10/2025	1,000	1,500	2,000	995	1,497	1,992	0.998x - 2.293	1.000
B32	SKC	224-PCXR4	091567	01/10/2025	1,000	1,500	2,000	1,002	1,500	2,003	1.008x - 15.778	0.999
B33	SKC	224-PCXR4	091756	02/10/2025	1,000	1,500	2,000	1,003	1,501	1,997	1.003x - 6.509	1.000
B34	SKC	224-PCXR4	612962	01/10/2025	1,000	1,500	2,000	996	1,512	1,996	1.001x - 5.867	0.999
B35	SKC	224-PCXR4	602882	01/10/2025	1,000	1,500	2,000	1,008	1,494	1,999	0.993x + 6.992	1.000
B36	SKC	224-PCXR4	626164	01/10/2025	1,000	1,500	2,000	997	1,502	1,992	0.999x - 3.235	1.000
B37	SKC	224-PCXR4	626256	01/10/2025	1,000	1,500	2,000	1,003	1,490	1,997	0.994x + 5.095	1.000
B38	SKC	224-PCXR4	626167	02/10/2025	1,000	1,500	2,000	998	1,513	1,995	1.000x - 5.277	0.999
B39	SKC	224-PCXR4	034637	03/10/2025	1,000	1,500	2,000	1,007	1,504	2,004	0.996x + 8.240	1.000
B40	SKC	224-PCXR4	798349	03/10/2025	1,000	1,500	2,000	998	1,510	2,002	0.998x + 3.905	1.000

Calibrated by : Adul Dangklom (Mr. Adul Dangklom)

Approved by : (Mr. Peera Detudom)

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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) Setting			Actual (Q std.)			Value From Calibration Curve	
					1	2	3	1	2	3	y	R^2
B41	SKC	224-PCXR4	612669	01/10/2025	1,000	1,500	2,000	1,010	1,508	2,009	1.000x + 2.612	0.999
B42	SKC	224-PCXR4	626041	02/10/2025	1,000	1,500	2,000	1,004	1,494	1,994	0.997x + 1.344	1.000
B43	SKC	224-PCXR4	034636	01/10/2025	1,000	1,500	2,000	998	1,505	2,002	1.001x - 5.177	1.000
B44	SKC	224-PCXR8	529341	01/10/2025	1,000	1,500	2,000	999	1,496	1,998	0.996x + 0.909	1.000
B45	SKC	224-PCXR8	529594	01/10/2025	1,000	1,500	2,000	996	1,510	1,992	1.005x - 11.543	1.000
B46	SKC	224-PCXR8	566743	01/10/2025	1,000	1,500	2,000	1,003	1,488	1,997	0.994x + 3.717	1.000
B47	SKC	224-PCXR8	566747	01/10/2025	1,000	1,500	2,000	1,004	1,500	1,993	0.996x + 2.230	1.000
B48	SKC	224-PCXR8	566753	01/10/2025	1,000	1,500	2,000	1,002	1,501	1,991	1.000x - 4.116	0.999
B49	SKC	224-PCXR8	566780	01/10/2025	1,000	1,500	2,000	995	1,502	1,990	0.997x - 1.978	1.000
B50	SKC	224-PCXR8	500400	02/10/2025	1,000	1,500	2,000	997	1,503	2,001	1.004x - 10.178	1.000
B51	SKC	224-PCXR8	500363	01/10/2025	1,000	1,500	2,000	1,001	1,502	1,993	0.995x + 2.848	1.000
B52	SKC	224-PCXR8	093186	03/10/2025	1,000	1,500	2,000	996	1,510	1,999	1.005x - 12.252	0.999
B53	SKC	224-PCXR8	707670	03/10/2025	1,000	1,500	2,000	1,002	1,496	2,004	1.003x - 8.791	1.000
B54	SKC	224-PCXR3	509821	03/10/2025	1,000	1,500	2,000	999	1,501	1,995	0.999x - 2.090	1.000
B55	SKC	224-PCXR3	510710	02/10/2025	1,000	1,500	2,000	1,002	1,503	2,006	1.007x - 13.250	0.999
B56	SKC	224-PCXR3	511450	01/10/2025	1,000	1,500	2,000	995	1,505	1,997	1.002x - 7.594	1.000
B57	SKC	224-PCXR3	510798	02/10/2025	1,000	1,500	2,000	998	1,500	1,994	0.999x - 7.163	0.999
B58	SKC	224-PCXR3	509852	03/10/2025	1,000	1,500	2,000	1,002	1,494	1,996	0.993x + 6.485	1.000
B59	SKC	224-PCXR3	509862	01/10/2025	1,000	1,500	2,000	1,006	1,505	1,998	0.996x + 5.117	1.000
B60	SKC	224-PCXR3	512655	02/10/2025	1,000	1,500	2,000	1,004	1,501	2,003	1.010x - 14.223	0.999
B61	SKC	224-PCXR3	503915	03/10/2025	1,000	1,500	2,000	993	1,495	1,994	0.999x - 4.942	1.000
B62	SKC	224-PCXR3	505975	03/10/2025	1,000	1,500	2,000	995	1,500	2,005	1.009x - 16.396	1.000
B63	SKC	224-PCXR3	511432	03/10/2025	1,000	1,500	2,000	996	1,497	1,991	0.998x - 3.171	1.000
B64	SKC	224-PCXR3	508502	03/10/2025	1,000	1,500	2,000	1,008	1,506	1,998	0.992x + 8.667	0.999
B65	SKC	224-PCXR3	508310	03/10/2025	1,000	1,500	2,000	1,006	1,492	2,003	1.000x - 4.355	1.000
B66	SKC	224-PCXR3	509861	03/10/2025	1,000	1,500	2,000	994	1,496	1,994	0.997x - 0.275	1.000
B67	SKC	224-PCXR3	506295	01/10/2025	1,000	1,500	2,000	997	1,505	2,001	1.004x - 10.258	1.000
B68	SKC	224-PCXR3	505872	03/10/2025	1,000	1,500	2,000	998	1,512	1,992	0.999x - 3.554	0.999
B69	SKC	224-PCXR3	508375	01/10/2025	1,000	1,500	2,000	997	1,489	1,996	0.997x - 2.309	1.000
B70	SKC	224-PCXR3	510623	03/10/2025	1,000	1,500	2,000	1,001	1,496	1,991	0.992x + 7.131	1.000
B71	SKC	224-PCXR3	508367	03/10/2025	1,000	1,500	2,000	999	1,498	1,995	0.998x + 6.433	1.000
B72	SKC	224-PCXR3	505977	03/10/2025	1,000	1,500	2,000	996	1,507	1,999	1.003x - 7.490	1.000
B73	SKC	224-PCXR3	512606	03/10/2025	1,000	1,500	2,000	1,004	1,503	2,003	1.001x - 5.285	0.999
B74	SKC	224-PCXR3	505993	01/10/2025	1,000	1,500	2,000	1,006	1,501	1,997	0.993x + 8.232	1.000
B75	SKC	224-PCXR3	509820	02/10/2025	1,000	1,500	2,000	1,005	1,494	1,995	0.997x - 2.979	0.999
B76	SKC	224-PCXR3	509811	02/10/2025	1,000	1,500	2,000	996	1,503	1,999	1.005x - 10.613	1.000
B77	SKC	224-PCXR3	508301	01/10/2025	1,000	1,500	2,000	1,003	1,490	1,998	0.994x + 4.694	1.000
B78	SKC	224-PCXR3	510677	01/10/2025	1,000	1,500	2,000	1,004	1,492	1,997	0.995x + 4.036	1.000
B79	SKC	224-PCXR3	510920	01/10/2025	1,000	1,500	2,000	1,008	1,504	2,006	1.006x - 9.588	0.999

Calibrated by : Adul Dangklom (Mr. Adul Dangklom)

Approved by : (Mr. Peera Detudom)

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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							
					Flow Rate (ml/min)						
					Setting			Actual (Q std.)			Value From Calibration Curve
No.	Brand	Model	Serial No.	Date	1	2	3	1	2	3	y	R^2
B80	SKC	224-PCXR3	504569	01/10/2025	1,000	1,500	2,000	1,004	1,510	2,004	0.999x - 0.786	0.999
B81	SKC	224-PCXR3	503480	01/10/2025	1,000	1,500	2,000	1,004	1,509	2,002	1.000x - 1.340	0.999
B82	SKC	224-PCXR3	505673	01/10/2025	1,000	1,500	2,000	1,007	1,502	2,003	0.994x+ 9.425	1.000
B83	SKC	224-PCXR3	510785	01/10/2025	1,000	1,500	2,000	997	1,494	1,994	0.999x - 1.727	0.999
B84	SKC	224-PCXR3	508333	01/10/2025	1,000	1,500	2,000	1,000	1,505	2,005	1.002x - 5.217	1.000
B85	SKC	224-PCXR3	505757	03/10/2025	1,000	1,500	2,000	996	1,507	1,998	1.001x - 4.459	1.000
B86	SKC	224-PCXR3	512625	03/10/2025	1,000	1,500	2,000	998	1,506	1,993	0.997x - 4.180	0.999
B87	SKC	224-PCXR3	504324	03/10/2025	1,000	1,500	2,000	1,003	1,510	2,004	1.000x + 1.037	1.000
B88	SKC	224-PCXR3	508307	03/10/2025	1,000	1,500	2,000	995	1,505	1,999	1.007x - 17.485	0.999
B89	SKC	224-PCXR3	509860	03/10/2025	1,000	1,500	2,000	999	1,500	2,001	1.002x - 6.218	1.000
B90	SKC	224-PCXR3	508366	02/11/2025	1,000	1,500	2,000	996	1,505	2,004	1.008x - 15.379	1.000
B91	SKC	224-PCXR3	510919	01/10/2025	1,000	1,500	2,000	1,004	1,504	2,003	0.998x + 1.328	1.000
B92	SKC	224-PCXR3	510987	03/10/2025	1,000	1,500	2,000	997	1,505	2,003	1.009x - 17.601	0.999
B93	SKC	224-PCXR3	509845	03/10/2025	1,000	1,500	2,000	1,006	1,511	2,001	0.998x + 2.138	0.999

Calibrated by : Adul Dangklom (Mr. Adul Dangklom)

Approved by : (Mr. Peera Detudom)

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Rotameter Calibration Report (For Personal Pump High Flow Adjust)

Calibration Method : Dry Cal Primary Flowmeter | Model : Defender 510-H | S/N : 136164

Calibration Data												
Rotameter Data			Calibration Data									
				Flow Rate (ml/min)								
				Flow Rate (Reading)			Actual (Q std.)			Value From Calibration Curve		
No.	Brand	Model	Date	1	2	3	1	2	3	y	R^2	
H-B01	Dwyer	VFB-65	01/10/2025	500	1,000	2,000	502.3	998.1	1996.9	0.999x + 2.995	1.000	
H-B02	Dwyer	VFB-65	01/10/2025	500	1,000	2,000	501.2	998.9	1998.1	0.998x + 4.159	1.000	
H-B03	Dwyer	VFB-65	01/10/2025	500	1,000	2,000	500.4	999.5	2000.3	1.000x - 1.574	0.999	
H-B04	Dwyer	VFB-65	01/10/2025	500	1,000	2,000	499.5	1000.6	1999.5	0.999x + 0.880	1.000	
H-B05	Dwyer	VFB-65	01/10/2025	500	1,000	2,000	499.1	1001.3	2001.6	1.001x - 7.095	0.999	
H-B06	Dwyer	VFB-65	01/10/2025	500	1,000	2,000	499.4	999.8	1994.1	1.000x + 2.760	1.000	
H-B07	Dwyer	VFB-65	02/10/2025	500	1,000	2,000	501.0	999.4	2000.7	0.997x + 1.623	1.000	
H-B08	Dwyer	VFB-65	01/10/2025	500	1,000	2,000	499.9	1001.7	2002.8	0.998x - 1.887	1.000	
H-B09	Dwyer	VFB-65	02/10/2025	500	1,000	2,000	499.3	999.2	1996.6	0.999x + 1.428	0.999	
H-B10	Dwyer	VFB-65	03/10/2025	500	1,000	2,000	498.7	1001.1	1997.8	0.996x + 6.669	1.000	

Calibrated by : Adul Dangklom (Mr.Adul Dangklom)

Approved by : (Mr. Peera Detudom)

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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

Calibration Data

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^2
L-B01	Dwyer	VFA-21	01/10/2025	50	100	200	50.7	99.8	199.6	1.000x + 0.067	1.000
L-B02	Dwyer	VFA-21	01/10/2025	50	100	200	50.2	99.4	198.7	1.001x - 1.181	0.999
L-B03	Dwyer	VFA-21	01/10/2025	50	100	200	50.8	99.2	201.5	1.002x + 0.053	1.000
L-B04	Dwyer	VFA-21	01/10/2025	50	100	200	49.7	101.6	200.8	1.001x + 0.344	1.000
L-B05	Dwyer	VFA-21	01/10/2025	50	100	200	50.5	100.4	201.6	0.998x + 0.225	0.999
L-B06	Dwyer	VFA-21	01/10/2025	50	100	200	50.1	100.5	201.8	1.003x - 0.103	1.000
L-B07	Dwyer	VFA-21	02/10/2025	50	100	200	50.6	100.8	201.3	0.998x + 0.877	1.000
L-B08	Dwyer	VFA-21	01/10/2025	50	100	200	49.8	101.3	198.9	1.000x - 0.165	1.000
L-B09	Dwyer	VFA-21	02/10/2025	50	100	200	50.1	99.6	200.7	1.002x - 0.766	0.999
L-B10	Dwyer	VFA-21	03/10/2025	50	100	200	50.9	100.8	201.2	1.003x + 0.694	1.000

Calibrated by : Adul Dangklom (Mr.Adul Dangklom)

Approved by : Peera Detudom (Mr. Peera Detudom)

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CLC Accredited ISO/IEC 17025

ilac-MRA

ANAB Accredit ED ACCREDIT ED CALIBRATION AND DIMENSIONAL MEASUREMENT ACDM-28.14

CERTIFICATE OF CALIBRATION

FOR

NOMENCLATURE	VACUUM GAUGE
MANUFACTURER	HI-LIGHT
MODEL/TYPE	N/A
SERIAL NO.	N/A[64-220066-2]
CLID.NO.	212301420
JOB CONTROL NO.	240720076549

CUSTOMER S.P.S. CONSULTING SERVICE CO., LTD.
7SOI PHAHOLYOTHrN 24 ROAD., JOMPOL,
CHATUCHAK, BANGKOK 10900

DATE OF RECEIVED : 19 July 2025 DATE OF ISSUED: 24 July 2025

The report or calibration shall not be reproduced except in full without approval of the Calib.-ation Laboratory Co., Ltd.

Calibrated By : Sittipong Pimdee
Calibration Engineer

Approved By : Mongkol Yotsoontorn
Authorized Signatory
24 July 2025

This Calibration Certificate documents the traceability to national standards, which realize the units of measurement according to the International System of Units (SI)

Certificate No. Q24076549

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REPORT OF CALIBRATION

FOR

NOMENCLATURE	VACUUM GAUGE
MANUFACTURER	HI-LIGHT
MODEL/TYPE	N/A
SERIAL NO.	N/A [64-220066-2]
DATE OF CALIBRATION	23 July 2025
DUE DATE OF CALIBRATION	23 July 2026

ENVIRONMENT CONDITIONS

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

PROCEDURE USED :

This instrument was calibrated under procedure No. CLC-CPPP-05 according to DKD-R 6-1 as calibration guidelines. The calibration was performed by direct measurement with Document Process Calibrator and Pressure Module which maintained by the Calibration Laboratory Co., Ltd.

REFERENCE STANDARD USED :

Document Process Calibrator, Fluke Model 74 1 B *SIN.* 8295020 with Pressure Module Model 700PD5 *SIN.* 89404505.

TRACEABILITY :

The measurements are traceable to International System of Units (SI), through National Institute of Metrology (Thailand). Certificate No. MP-0040-24.

UNCERTAINTY :

The reported uncertainty is based on a standard uncertainty multiplied by coverage factor of $k=2$. It has been evaluated according to the "Calibration of Pressure Gauges (DKD-R 6-1)" which provides a level of confidence approximately 95%.

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CONDITION OF CALIBRATION ITEM :RECEIVED IN GOOD OPERATIONAL CONDITION

MEASUREMENT RESULTS: (X) without adjustment ( ) adjustment

The DUC was exercised by applying a known pressure from its zero to full scale 1 times. Then 2 series of known gauge pressure were applied. The STD reading were recorded and the means value were reported in the table below.

CALIBRATION DATA

CORRECTION OF PRESSURE

DUC Test point	STD Reading (kPa)		Conversion to inHg		Correction (inHg)	
(inHg)	Up	Down	Up	Down	Up	Down
0	0.00	0.00	0.0	0.0	0.0	0.0
-5	-17.61	-17.95	-5.2	-5.3	+0.2	+0.3
-10	-34.54	-34.54	-10.2	-10.2	+0.2	+0.2
-15	-51.13	-51.47	-15.1	-15.2	+0.1	+0.2
-20	-67.72	-68.06	-20.0	-20.1	+0.0	+0.1
-25	-84.31	-84.31	-24.9	-24.9	+0.1	+0.1
-30	-101.24	-101.24	-29.9	-29.9	+0.1	+0.1

Uncertainty of measurement± 0.2 inHg

Transmitting fluid : Air.

Technical Note. Conversion factor 1 kPa ; 0.2953003 inHg

Note. The Scope of Accredited ANAB Certificate No. ACDM-28!4 Version 012 Page 43 of 67

This report is valid for the above stated instrument/s only.

End of Certificate

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

NSC-TISI-TIS1 7025
CALIBRATION 0349

CERTIFICATE No : 25M2254
REFERENCE No : 76365-1

Certificate of Calibration

EQUIPMENT	:	DIGITAL BALANCE
MANUFACTURER	:	METTLER TOLEDO
MODEL	:	XS105DU
SERIAL No	:	1126422905
ID No	:	BA05/50
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	:	07-Mar-25
APPROVED BY	:	PONGSAK J.
ISSUED DATE	:	13-Mar-25
RECEIVED DATE	:	07-Mar-25

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

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

CERTIFICATE No : 25M2254

Calibration Report

EQUIPMENT	:	DIGITAL BALANCE	**MODEL**	:	XS105DU
MANUFACTURER	:	METTLER TOLEDO	**S/N**	:	1126422905
ID No	:	BA05/50	**RECEIVED DATE**	:	07-Mar-25
AIR PRESSURE	:	1009mbar ± 1mbar	**CALIBRATION DATE**	:	07-Mar-25
AMBIENT TEMPERATURE	:	24° C ± 1° C	**RELATIVE HUMIDITY**	:	54 %RH ± 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 NOT ADJUSTED BEFORE CALIBRATION. 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 LINEARLITY 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	C02250116	28-Jan-27
2) STANDARD WEIGHT	E2	15843	C02250117	29-Jan-27

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

RESULT OF CALIBRATION :- WITHOUT ADJUSTMENT

1. ZERO SETTING FUNCTION : NORMAL
2. TARE FUNCTION : NORMAL
3. REPEATABILITY OF READING AT 120 g WAS 0.000055 g
4. DEPARTURE FROM NOMINAL VALUE/ LINEARITY

NOMINAL VALUE (g)	BALANCE READING (g)	CORRECTION (g)	UNCERTAINTY (± g)
0.00	0.00000	0.00000	0.000065
0.02	0.01999	0.00001	0.000065
0.10	0.10001	-0.00001	0.000066
0.20	0.20001	-0.00001	0.000066
0.50	0.50002	-0.00002	0.000065
1.00	1.00003	-0.00003	0.000066
2.00	2.00001	-0.00001	0.000067
5.00	5.00002	-0.00002	0.000068
10.00	10.00000	0.00000	0.000070
20.00	20.00004	-0.00004	0.000078
50.00	50.0000	0.0000	0.00013
100.00	100.0001	-0.0001	0.00019
120.00	120.0002	-0.0002	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

F-G010 REV 03

บริษัท พาราไซแอนติฟิค จำกัด
BARA SCIENTIFIC CO., LTD.

PREVENTIVE MAINTENANCE/ CALIBRATION

FTIR SPECTROPHOTOMETER

IRXross"SHIMADZU"

ID NO. : -
REPORT NO : I-A2-25-TK-6811-0398
DATE OF REPORT : 28 November 2025
COMPLETION DATE : 28 November 2025
NEXT DUE DATE : On November 2026

FOURIER TRANSFORM INFRARED SPECTROPHOTOMETER

SERIAL NO.	A22936201045
CUSTOMER	บริษัท เอส.พี.เอส. คอนซัลติ้ง เซอร์วิส จำกัด
ADDRESS	7 ถนนพหลโยธิน แขวงจอมพล เขตจตุจักร
	กรุงเทพมหานคร 10900
ATTENTION	คุณวราภรณ์ ภูวัด
PHONE	087-737-4171
FAX	-
DONE BY	นายเฉลิมชาติ คงไทย
SERVICE REPORT NO.	TK-6811-0398

SIGNED FOR AND ON BEHALF OF
BARA SCIENTIFIC CO., LTD.

เฉลิมชาติ

CHALERMCHAT KONGTHAI

TOTAL NUMBER OF PAGES : 39

อนุมัติใช้วันที่ 3 มีนาคม 2553

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CHALERMCHAT KONGTHAI

TOTAL NUMBER OF PAGES : 39

1.0 EQUIPMENT LISTING

EQUIPMENT	SERIAL NUMBER
IRXross	A22936201045

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CHALERMCHAT KONGTHAI

TOTAL NUMBER OF PAGES : 39

2.0 OPERATIONAL TESTING AND QUALIFICATION

2.1 IRXross

TEST	PURPOSE	CHECK	COMMENTS
IRSOLUTION SOFTWARE	VERIFY VERSION OF SOFTWARE	**OK**	-
POWER SPECTRUM	VERIFY INTENSITY OF STATED WAVENUMBERS ARE WITHIN SPECIFICATIONS - 4600CM-1 (10.0 OR MORE) - 4000CM-1 (25.0) - 3000CM-1 (50.0) - MAX. WAVENUMBER (37.5) - 700CM-1 (10.0) - 500CM-1 (2.0) - 403CM-1 (0.5)	**OK**	-
100% BASELINE FLATNESS	VERIFY FLATNESS OF THE 100% BASELINE SPECIFICATION - 4600 ~ 2000CM-1 (+/- 4%T) 2000 ~ 750 CM-1 (+/- 2%T)	**OK**	-
WAVENUMBER ACCURACY	VERIFY WAVENUMBER ACCURACY WITH POLYSTYRENE FILM.AND ABSORPTION PEAKS AT THE WAVENUMBER OF 1601.4CM-1 AND 906.7CM-1 SHOULD BE WITHIN ±1.0CM-1	**OK**	-
LASER BEAM IN SAMPLE COMPARTMENT	VERIFY THAT THE BEAMSPLITTER IS NOT DAMAGED BY MOISTURE AND LASER BEAM IN SAMPLE COMPARTMENT SHOULD NOT BE SCATTERED.	**OK**	-

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CHALERMCHAT KONGTHAI

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3.0 SPECIFICATIONS OF EQUIPMENT

POWER SPECTRUM	INTENSITY OF STATED WAVENUMBERS SHOULD BE WITHIN - 4600CM-1 (10% power maximun value min.) - 4000CM-1 (25% power maximun value min.) - 3000CM-1 (50% power maximun value min.) - MAX. WAVENUMBER (37.5%) - 700CM-1 (10% power maximun value min.) - 500CM-1 (2% power maximun value min.) - 403CM-1 (0.5% power maximun value min.) - 351 CM-1 (0.01% power maximun value min.)
RESOLUTION	Difference between near 2870 cm-1 – 2851 cm-1 ≥ 18%T Difference between near 1589 cm-1 – 1583 cm-1 ≥ 12%T
WAVENUMBER ACCURACY	Wavelength accuracy at each wavelength lies within the prescribed range. - 3060.0cm-1 rating ±1.5cm-1 - 2849.5cm-1 rating ±1.5cm-1 - 1942.9cm-1 rating ±1.5cm-1 - 1601.2cm-1 rating ±1.0cm-1 - 1583.0cm-1 rating ±1.0cm-1 - 1154.5cm-1 rating ±1.0cm-1 - 1028.3cm-1 rating ±1.0cm-1
REPRODUCIBILITY OF WAVENUMBER	Difference between the two measured results (2849.5cm-1)≤±5.0 cm-1. Difference between the two measured results (1601.2cm-1)≤±1.0 cm-1. Difference between the two measured results (1028.3cm-1)≤±1.0 cm-1.
REPRODUCIBILITY OF TRANSMITTANCE	Difference between the two measured results (2849.5cm-1)≤±0.5 %T Difference between the two measured results (1601.2cm-1)≤±0.5 %T Difference between the two measured results (1028.3cm-1)≤±0.5 %T

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CHALERMCHAT KONGTHAI

TOTAL NUMBER OF PAGES : 39

4.0 OPERATIONAL QUALIFICTION RECORD

4.1 POWER SPECTRUM CHECK

CONDITIONS	MEASURED AT TRANSMITTANCE MODE IN %T FROM 4600 TO 400CM-1 RESOLUTION SET TO 1CM-1			
SPECIFICATION	INTENSITY OF STATED WAVENUMBERS SHOULD BE WITHIN - 4600CM-1 (10% or more of MAX) - 4000CM-1 (25% or more of MAX.) - 3000CM-1 (50% or more of MAX.) - MAX. WAVENUMBER (37.5% or more) - 700CM-1 (10% or more of MAX.) - 500CM-1 (2% or more of MAX.) - 403CM-1 (0.5% or more of MAX.) - 351 CM-1 (0.01% or more of MAX.)			
RESULTS	**WAVELENGTH**	**MEASURED VALUE**	**STANDARD VALUE**	**PASS/ NO PASS**
	4600CM-1	**14.96**	**4.71**	**PASS**
	4000CM-1	**23.87**	**8.82**	**PASS**
	3000CM-1	**40.51**	**23.53**	**PASS**
	MAX. WAVENUMBER	**58.82**	**37.50**	**PASS**
	700CM-1	**13.44**	**5.88**	**PASS**
	500CM-1	**5.14**	**1.18**	**PASS**
	403CM-1	**1.58**	**0.29**	**PASS**
	351CM-1	**0.23**	**0.01**	**PASS**
DATA				

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CHALERMCHAT KONGTHAI

TOTAL NUMBER OF PAGES : 39

4.2 RESOLUTION CHECK

CONDITIONS	MEASURED AT TRANSMITTANCE MODE IN %T FROM 4600 TO 400CM-1 RESOLUTION SET TO 1CM-1					
SPECIFICATION	Difference between near 2870 cm-1 – 2851 cm-1 ≥ 18%T Difference between near 1589 cm-1 – 1583 cm-1 ≥ 12%T					
RESULTS	**WAVELENGTH**	**RATING**	**MEASURED VALUE**		**MEASURED DIFF.**	**PASS/ NO PASS**
			MAX	**MIN**		
	2870CM-1 -2850CM-1	18%T	**38.12**	**13.28**	**24.84**	**PASS**
	1589CM-1 - 1583 CM-1	12%T	**57.59**	**40.06**	**17.53**	**PASS**
DATA						

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CHALERMCHAT KONGTHAI

TOTAL NUMBER OF PAGES : 39

4.3 WAVENUMBER ACCURACY CHECK

CONDITIONS	MEASURED AT TRANSMITTANCE MODE IN %T FROM 4600 TO 400CM-1 RESOLUTION SET TO 1CM-1			
CONDITIONS	Wavelength accuracy at each wavelength lies within the prescribed range. - 3060.0cm-1 rating ±1.5cm-1 - 2849.5cm-1 rating ±1.5cm-1 - 1942.9cm-1 rating ±1.5cm-1 - 1601.2cm-1 rating ±1.0cm-1 - 1583.0cm-1 rating ±1.0cm-1 - 1154.5cm-1 rating ±1.0cm-1 - 1028.3cm-1 rating ±1.0cm-1			
RESULTS	**WAVELENGTH (CM-1)**	**MEASURED VALUE (CM-1)**	**ERROR (CM-1)**	**PASS/NO PASS**
	3060.0CM-1	**3060.1**	***0.1***	**PASS**
	2849.5CM-1	**2849.9**	***0.4***	**PASS**
	1942.9CM-1	**1943.3**	***0.4***	**PASS**
	1601.2CM-1	**1600.9**	***-0.3***	**PASS**
	1583.0CM-1	**1583.6**	***0.6***	**PASS**
	1154.5CM-1	**1154.4**	***-0.1***	**PASS**
	1028.3CM-1	**1028.1**	***-0.2***	**PASS**
DATA				

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TOTAL NUMBER OF PAGES : 39

4.4 REPRODUCIBILITY OF WAVENUMBER CHECK

CONDITIONS	MEASURED AT TRANSMITTANCE MODE IN %T FROM 4600 TO 400CM-1 RESOLUTION SET TO 1CM-1				
STANDARD	POLYSTYRENE STANDARD NIST STANDARD REFERENCE MATERIAL 1921				
SPECIFICATION	Difference between the two measured results (2849.5cm-1)≤±5.0 cm-1. Difference between the two measured results (1601.2cm-1)≤±1.0 cm-1. Difference between the two measured results (1028.3cm-1)≤±1.0 cm-1.				
RESULTS	**ACTUAL PEAK (CM-1)**	**MEASURED PEAK (CM-1)**		**ERROR (CM-1)**	**PASS/NO PASS**
		NO.1	**NO.2**		
	2849.5	**2849.9**	**2849.9**	***0.0***	**PASS**
	1601.2	**1600.9**	**1600.9**	***0.0***	**PASS**
	1028.3	**1028.1**	**1028.1**	***0.0***	**PASS**
DATA					

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CHALERMCHAT KONGTHAI

TOTAL NUMBER OF PAGES : 39

4.5 REPRODUCIBILITY OF TRANSMITTANCE CHECK

CONDITIONS	MEASURED AT TRANSMITTANCE MODE IN %T FROM 4600 TO 400CM-1 RESOLUTION SET TO 1CM-1				
STANDARD	POLYSTYRENE STANDARD NIST STANDARD REFERENCE MATERIAL 1921				
SPECIFICATION	Difference between the two measured results (2849.5cm-1)≤±0.5 %T Difference between the two measured results (1601.2cm-1)≤±0.5 %T Difference between the two measured results (1028.3cm-1)≤±0.5 %T.				
RESULTS	**ACTUAL PEAK (CM-1)**	**MEASURED PEAK (%T)**		**ERROR (%T)**	**PASS/NO PASS**
		NO.1	**NO.2**		
	2849.5	**13.28**	**13.31**	***-0.03***	**PASS**
	1601.2	**8.78**	**8.79**	***-0.01***	**PASS**
	1028.3	**20.17**	**20.20**	***-0.03***	**PASS**
DATA					

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TOTAL NUMBER OF PAGES : 39

5.0 EQUIPMENT CERTIFICATION

THE TEST DATA HAS DETERMINED THAT THE EQUIPMENT DESCRIBED MEETS ALL SPECIFICATIONS OUTLINED IN THIS CALIBRATION REPORT.

REPORT PREPARED BY : ***CHALERMCHAT KONGTHAI***
SERVICE ENGINEER
BARA SCIENTIFIC CO., LTD.

SIGNED FOR AND ON BEHALF OF
BARA SCIENTIFIC CO., LTD.

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CHALERMCHAT KONGTHAI

TOTAL NUMBER OF PAGES : 39

========== SHIMADZU FTIR Validation Report(JP18) ==========

Instrument	: DESKTOP-5ULUA14-Instrument1	Overall Judgement	: PASS		
Serial No.	: A22936201045	Temperature	: 23	Humidity	: 40
Window	: KRS-5	Change-Beam	: Un-using	No. of Scans	: 45
Sample ID	:	File name	: 1128094918		
Sample name	: Polystyrene Film				
Option	:	Comments	:		
Inspected by	: System Administrator	Date/Time	: 2025-11-28/09:57:55		

Approved by : _____ Date : _____

1. Power spectrum — PASS

Wavenumber cm-1	Measured E	Standard E	
4600.0	14.96	4.71	PASS
4000.0	23.87	8.82	PASS
3000.0	40.51	23.53	PASS
at Maximum	58.82	37.50	PASS
700.0	13.44	5.88	PASS
500.0	5.14	1.18	PASS
403.0	1.58	0.29	PASS
351.0	0.23	0.01	PASS

2. Resolution — PASS

Wavenumber cm-1	Measured cm-1	Measured %T	Standard %T	
2870.0	2870.1	38.12		
2850.0	2849.9	13.28		
Peak depth(%T)		24.84	18.00	PASS
1589.0	1588.4	57.59		
1583.0	1583.6	40.06		
Peak depth(%T)		17.53	12.00	PASS

3. Wavenumber accuracy — PASS

Wavenumber cm-1	Measured cm-1	Error cm-1	Tolerance cm-1	
3060.0	3060.1	0.1	+/-1.5	PASS
2849.5	2849.9	0.4	+/-1.5	PASS
1942.9	1943.3	0.4	+/-1.5	PASS
1601.2	1600.9	-0.3	+/-1.0	PASS
1583.0	1583.6	0.6	+/-1.0	PASS
1154.5	1154.4	-0.1	+/-1.0	PASS
1028.3	1028.1	-0.2	+/-1.0	PASS

4. Reproducibility of Wavenumber — PASS

Wavenumber cm-1	No.1 cm-1	No.2 cm-1	Error cm-1	Tolerance cm-1	
2849.5	2849.9	2849.9	0.0	within5.0	PASS
1601.2	1600.9	1600.9	0.0	within1.0	PASS
1028.3	1028.1	1028.1	0.0	within1.0	PASS

5. Reproducibility of Transmittance — PASS

Wavenumber cm-1	No.1 %T	No.2 %T	Error %T	Tolerance %T	
2849.5	13.28	13.31	-0.03	within0.5	PASS
1601.2	8.78	8.79	-0.01	within0.5	PASS
1028.3	20.17	20.20	-0.03	within0.5	PASS

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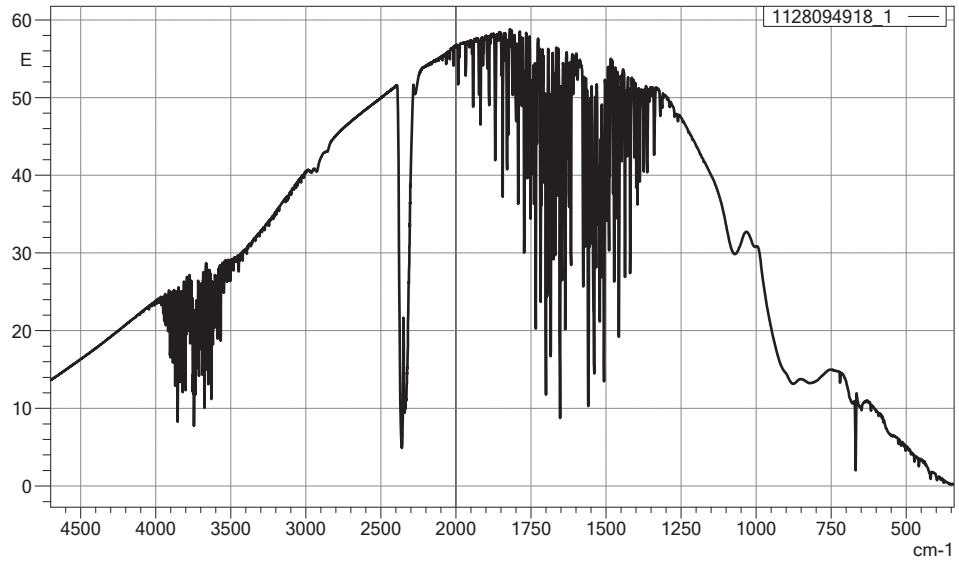
Power Spectrum

File name: C:\LabSolutions\LabSolutionsIR\Data\Jp\2025\1128094918_1.ispd



Polystyrene Spectra

File name: C:\LabSolutions\LabSolutionsIR\Data\Jp\2025\1128094918_2.ispd
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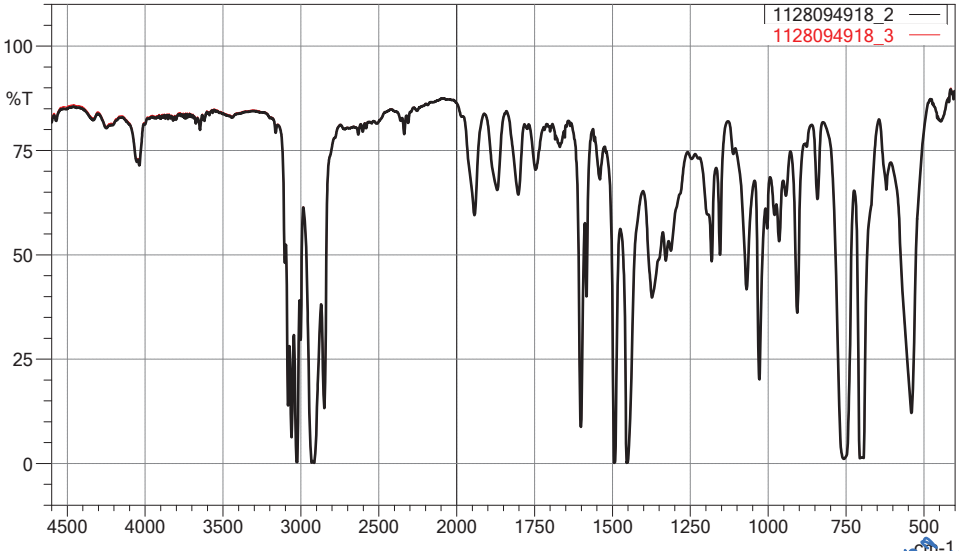


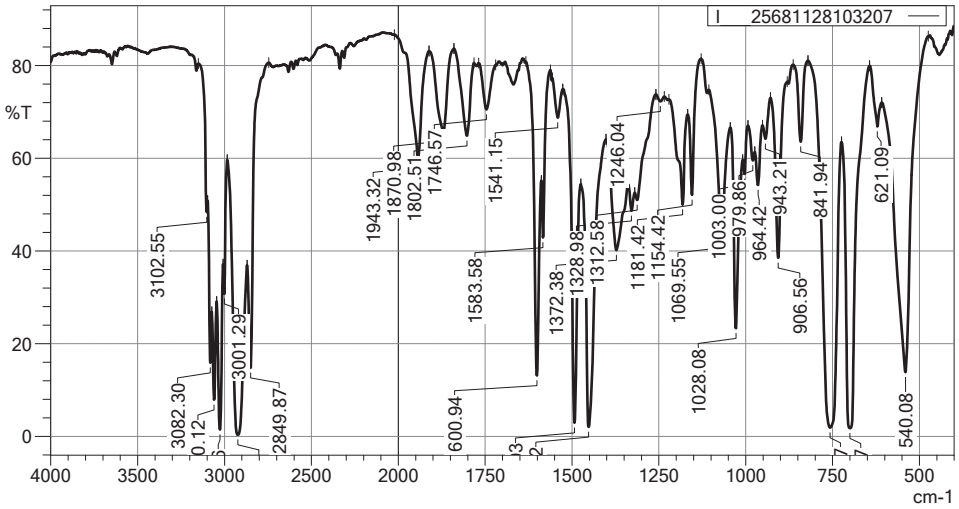
2


```
************************************************************
FTIR Diagnostic Report
28/11/2568 09:48        IRXross  SerNo: A22936201045
User: System Administrator
************************************************************
Instrument:     IRXross
Interface:      Main/Zeta OK
Version:        Main ROM 1.00, Prog 1.01
                Zeta ROM 1.00, Prog 1.00
Ram[kB]:        Main 16284, Zeta 128

Checksum:       Main ROM 0X9326, PRG 0X12EC
Checksum:       Zeta ROM 000000, PRG 0X8E2D
************************************************************
Equipment:
Mirror: 0,      Aperture: Present
ASC A: None
External Beam:  None
Laser:  OK,     N2: OK
Beamsplitter:   KBr
Detector:       standard        Option1:        None
Light Source:   OK
Accessory:
************************************************************
Diagnostic Measurements:
Piezo Voltage 101:      PASS
Piezo Voltage 102:      PASS
Power Spectrum: PASS
Pos.[cm-1]:     3000    OK (Limit: 15)   Value: 101.813
Pos.[cm-1]:     2000    OK (Limit: 30)   Value: 140.342
Pos.[cm-1]:     1000    OK (Limit: 12)   Value: 74.7537
************************************************************
Working Time:
                        Started Used
Light source[IR]:       27/11/2568      25      hours
Laser:          27/11/2568      25      hours

Schedule of periodical inspection
        Last:   27/11/2568      Next:   364     Days later
************************************************************
```

Peak Pick

Date: 28/11/2568 10:32:28
System Administrator

File name: D:\BSC\Installation 27-11-2025\I___25681128103207.ispd



	Item	Value
1	Comment	
2	Sample name	
3	Sample ID	
6	Apodization	SqrTriangle
7	Min	400
8	Max	4000
9	No. of Scans	45
10	Resolution	2 cm-1
11	FTIR Model	IRXross_DESKTOP-5ULUA14-Instrument1

Peak table

	Peak	Intensity	Corr. Intensity	Base (H)	Base (L)	Area	Corr. Area	Comment
1	540.08	13.86	65.49	608.55	474.50	5946.129	3157.287	
2	621.09	66.88	8.02	643.27	608.55	956.666	123.331	
3	700.17	1.79	66.63	724.28	643.27	4337.495	2048.452	
4	757.07	1.90	67.58	820.73	724.28	5671.401	2998.749	
5	841.94	63.56	17.06	863.16	820.73	1073.168	250.831	
6	906.56	38.52	36.12	928.74	880.52	1796.597	580.266	
7	943.21	64.22	5.11	951.89	928.74	747.858	55.245	
8	964.42	54.24	9.64	974.07	951.89	884.658	91.755	
9	979.86	59.55	3.54	993.36	974.07	717.974	27.937	
10	1003.00	56.61	5.84	1008.79	993.36	594.520	29.248	
11	1028.08	23.33	40.10	1044.47	1008.79	1879.034	563.969	
12	1069.55	42.91	27.02	1106.19	1044.47	2426.217	617.120	
13	1154.42	52.10	21.26	1166.95	1128.38	1148.107	201.785	
14	1181.42	50.02	20.30	1220.96	1166.95	1977.881	415.678	

15	1246.04	72.28	1.27	1258.57	1234.46	653.907	16.196	
16	1312.58	51.00	3.94	1319.33	1258.57	2281.814	44.770	
17	1328.98	48.70	4.76	1338.62	1319.33	939.630	41.809	
18	1372.38	40.18	19.34	1402.27	1338.62	3196.882	601.435	
19	1452.42	2.06	55.36	1474.60	1402.27	4359.446	1414.938	
20	1492.93	2.97	58.68	1526.68	1474.60	2709.531	869.919	
21	1541.15	68.78	7.29	1556.58	1526.68	824.687	110.492	
22	1583.58	42.92	16.69	1588.41	1562.37	904.422	48.199	
23	1600.94	13.13	49.31	1632.77	1588.41	2019.479	601.098	
24	1746.57	70.55	9.82	1768.75	1719.57	1190.100	223.681	
25	1802.51	64.88	16.77	1840.12	1782.26	1474.020	439.268	
26	1870.98	65.92	17.52	1911.49	1840.12	1741.835	557.402	
27	1943.32	60.26	23.89	2022.40	1911.49	2447.143	773.601	
28	2849.87	14.83	29.22	2870.13	2745.72	4756.220	-371.243	
29	2923.17	0.37	47.07	2984.89	2870.13	8849.449	2915.762	
30	3001.29	30.77	13.60	3009.00	2984.89	1348.145	104.554	
31	3026.36	1.49	31.85	3045.65	3009.00	3096.413	645.893	
32	3060.12	7.90	20.04	3073.62	3045.65	2292.325	277.883	
33	3082.30	15.93	19.93	3096.77	3073.62	1626.199	211.110	
34	3102.55	48.41	5.63	3150.77	3096.77	1585.259	-269.910	

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===== Shimadzu LabSolutions Check the Program Files Report =====

Program Name: ActivationPackage
Version: 2.10.0
Date Checked: 28/11/2568 11:09:54(+07:00)
PC Information: Stand-alone PC(DESKTOP-5ULUA14)

File Name	File Size	File Date	Check Sum
ActivateTool.exe	Pass	Pass	Pass
ActivateCommon.dll	Pass	Pass	Pass
ActivateLicenseInfo.dll	Pass	Pass	Pass
ActivateDPAPI.dll	Pass	Pass	Pass
ActivateCommonWrapper.exe	Pass	Pass	Pass
LSSSWA.ocx	Pass	Pass	Pass
LSSSWADaemon.exe	Pass	Pass	Pass
sx32w.dll	Pass	Pass	Pass
ActivateTool.resources.dll	Pass	Pass	Pass
ActivateTool.resources.dll	Pass	Pass	Pass

Program Name: LabSolutions Mng
Version: 1.122
Date Checked: 28/11/2568 11:09:54(+07:00)
PC Information: Stand-alone PC(DESKTOP-5ULUA14)

File Name	File Size	File Date	Check Sum
___zd.ttf	Pass	Pass	Pass
admin.bmp	Pass	Pass	Pass
AxInterop.AcroPDFLib.dll	Pass	Pass	Pass
AxInterop.LSSDATAEXPLORERLib.dll	Pass	Pass	Pass
AxInterop.LSSSWALib.dll	Pass	Pass	Pass
AxInterop.SkyViewCOM.dll	Pass	Pass	Pass
Barcode2.dll	Pass	Pass	Pass
BizPrintCom.exe	Pass	Pass	Pass
DotNetZip.dll	Pass	Pass	Pass
dsofile.dll	Pass	Pass	Pass
EntityFramework.dll	Pass	Pass	Pass
EntityFramework.SqlServer.dll	Pass	Pass	Pass
extdllR.dll	Pass	Pass	Pass
FarPoint.CalcEngine.dll	Pass	Pass	Pass
FarPoint.Excel.dll	Pass	Pass	Pass
FarPoint.PDF.dll	Pass	Pass	Pass
FarPoint.PluginCalendar.WinForms.dll	Pass	Pass	Pass
FarPoint.Win.Chart.dll	Pass	Pass	Pass
FarPoint.Win.dll	Pass	Pass	Pass
FarPoint.Win.Ink.dll	Pass	Pass	Pass
FarPoint.Win.Spread.dll	Pass	Pass	Pass
FarPoint.Win.Spread.Html.dll	Pass	Pass	Pass
FarPoint.Win.TextRenderer.dll	Pass	Pass	Pass
FPBF.dll	Pass	Pass	Pass
fplib.dll	Pass	Pass	Pass
fplibn.dll	Pass	Pass	Pass
Interop.AcroPDFLib.dll	Pass	Pass	Pass
Interop.ADOX.dll	Pass	Pass	Pass
Interop.BizPrintCom.dll	Pass	Pass	Pass
Interop.CDFView.dll	Pass	Pass	Pass
Interop.DAO.dll	Pass	Pass	Pass
Interop.DSOFile.dll	Pass	Pass	Pass
Interop.Excel.dll	Pass	Pass	Pass
Interop.IRView.dll	Pass	Pass	Pass
Interop.LSSCompressCab.dll	Pass	Pass	Pass
Interop.LSSDATAEXPLORERLib.dll	Pass	Pass	Pass
Interop.LSSFileWrapper.dll	Pass	Pass	Pass
Interop.LSSSWALib.dll	Pass	Pass	Pass
Interop.Office.dll	Pass	Pass	Pass

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===== Shimadzu LabSolutions Check the Program Files Report =====

Interop.SKYPDFWRITERLIBLib.dll	Pass	Pass	Pass
Interop.SkyViewCOM.dll	Pass	Pass	Pass
Interop.SpectrumView.dll	Pass	Pass	Pass
Interop.VBIDE.dll	Pass	Pass	Pass
invalid.bmp	Pass	Pass	Pass
LabSolutionsAPI.dll	Pass	Pass	Pass
ldf_jb2.dll	Pass	Pass	Pass
LSSAccessControl.dll	Pass	Pass	Pass
LSSAccessControlCommonInfo.dll	Pass	Pass	Pass
LSSAcquisitionSequence.Client.dll	Pass	Pass	Pass
LSSAcquisitionSequence.Interface.dll	Pass	Pass	Pass
LSSAcquisitionSequence.Service.dll	Pass	Pass	Pass
LSSADCooperationSettings.exe	Pass	Pass	Pass
LSSADCooperationSettings.exe.manifest	Pass	Pass	Pass
LSSAgentConverter.exe	Pass	Pass	Pass
LSSAgentConverter.exe.manifest	Pass	Pass	Pass
LSSAgentConverter.XmlSerializers.dll	Pass	Pass	Pass
LSSAgentConverterCommonInfo.dll	Pass	Pass	Pass
LSSAgentConverterService.exe	Pass	Pass	Pass
LSSAgentConverterSetting.exe	Pass	Pass	Pass
LSSAgentConverterSetting.exe.manifest	Pass	Pass	Pass
LSSAgentConverterSetting.XmlSerializers.dll	Pass	Pass	Pass
LSSAutoRegister.exe	Pass	Pass	Pass
LSSAutoRegisterCommonInfomation.dll	Pass	Pass	Pass
LSSAutoRegisterCommonInfomation.XmlSerializers.dll	Pass	Pass	Pass
LSSAutoRegisterService.exe	Pass	Pass	Pass
LSSAutoRegisterSetting.exe	Pass	Pass	Pass
LSSBackup.exe	Pass	Pass	Pass
LSSBackup.exe.manifest	Pass	Pass	Pass
LSSBackup.XmlSerializers.dll	Pass	Pass	Pass
LSSBackupRestoreCL.dll	Pass	Pass	Pass
LSSBackupRestoreSV.dll	Pass	Pass	Pass
LSSBaseManagerCL.dll	Pass	Pass	Pass
LSSBaseManagerSV.dll	Pass	Pass	Pass
LSSBatchCreateMultiDataReport.dll	Pass	Pass	Pass
LSSBatchProcCL_RCW.dll	Pass	Pass	Pass
LSSBatchProcSV_RCW.dll	Pass	Pass	Pass
LSSBatchQueueCommunicationCL.dll	Pass	Pass	Pass
LSSBatchQueueCommunicationSV.dll	Pass	Pass	Pass
LSSBatchQueueManagerCL.dll	Pass	Pass	Pass
LSSBatchQueueManagerCommonInfo.dll	Pass	Pass	Pass
LSSBatchQueueManagerCommonInfo.XmlSerializers.dll	Pass	Pass	Pass
LSSBatchQueueManagerDlg.dll	Pass	Pass	Pass
LSSBatchQueueManagerDlg_RCW.dll	Pass	Pass	Pass
LSSBatchQueueManagerSV.dll	Pass	Pass	Pass
LSSBatchQueueSorting.dll	Pass	Pass	Pass
LSSBatchSetupMultiDataReport.dll	Pass	Pass	Pass
LSSCacheMaintenanceTool.exe	Pass	Pass	Pass
LSSCacheMaintenanceToolCore.dll	Pass	Pass	Pass
LSSCacheMaintenanceToolCUI.exe	Pass	Pass	Pass
LSSCacheManager.exe	Pass	Pass	Pass
LSSCacheManagerTask.bat	Pass	Pass	Pass
LSSCacheSV.dll	Pass	Pass	Pass
LSSCheckDBAccess.exe	Pass	Pass	Pass
LSSClientLicenseManagerMain.exe	Pass	Pass	Pass
LSSClientLicenseManagerTask.bat	Pass	Pass	Pass
LSSCommManager_RCW.dll	Pass	Pass	Pass
LSSCommonFunction.dll	Pass	Pass	Pass
LSSCommonFunction.XmlSerializers.dll	Pass	Pass	Pass
LSSCommonInfo.dll	Pass	Pass	Pass
LSSCommonInfo.XmlSerializers.dll	Pass	Pass	Pass
LSSCommonResource.dll	Pass	Pass	Pass
LSSCommonToolsMng.dll	Pass	Pass	Pass

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===== Shimadzu LabSolutions Check the Program Files Report =====

LSSCommunicationPoint.dll	Pass	Pass	Pass
LSSCompletionDBManager.dll	Pass	Pass	Pass
LSSCompletionManager.exe	Pass	Pass	Pass
LSSCompletionWCF.Client.dll	Pass	Pass	Pass
LSSCompletionWCF.Common.dll	Pass	Pass	Pass
LSSCompletionWCF.Service.dll	Pass	Pass	Pass
LSSCompressCab.dll	Pass	Pass	Pass
LSSConfigurationManager.exe	Pass	Pass	Pass
LSSConfigurationSV.dll	Pass	Pass	Pass
LSSCreateMsdeDb.exe	Pass	Pass	Pass
LSSCreateMsdeDb.exe.manifest	Pass	Pass	Pass
LSSCreateMsdeDbCUI.exe	Pass	Pass	Pass
LSSCreateMultiDataReport.dll	Pass	Pass	Pass
LSSCreateMultiDataReportTemplate.exe	Pass	Pass	Pass
LSSCreateMultiDataReportTemplate.exe.manifest	Pass	Pass	Pass
LSSCreateOQProject.exe	Pass	Pass	Pass
LSSCreateOracleDb.exe	Pass	Pass	Pass
LSSCreateOracleDb.exe.manifest	Pass	Pass	Pass
LSSCustomizeInfoManager.exe	Pass	Pass	Pass
LSSCustomizeInfoManager.exe.manifest	Pass	Pass	Pass
LSSCustomizeInfoManagerCommonInfo.dll	Pass	Pass	Pass
LSSCustomizeInfoManagerCommonInfo.XmlSerializers.dll	Pass	Pass	Pass
LSSDataExplorerEx.dll	Pass	Pass	Pass
LSSDataExplorerEx.ocx	Pass	Pass	Pass
LSSDataManage_RCW.dll	Pass	Pass	Pass
LSSDataManager.dll	Pass	Pass	Pass
LSSDataManagerCL.dll	Pass	Pass	Pass
LSSDataManagerCommonInfo.dll	Pass	Pass	Pass
LSSDataManagerCommonInfo.XmlSerializers.dll	Pass	Pass	Pass
LSSDataManagerForm.exe	Pass	Pass	Pass
LSSDataManagerForm.exe.manifest	Pass	Pass	Pass
LSSDataManagerHost.exe	Pass	Pass	Pass
LSSDataManagerHostExtendDb.exe	Pass	Pass	Pass
LSSDataManagerSV.dll	Pass	Pass	Pass
LSSDataManagerToolCommonInfo.dll	Pass	Pass	Pass
LSSDataManagerToolCommonInfo.XmlSerializers.dll	Pass	Pass	Pass
LSSDataUICommon.dll	Pass	Pass	Pass
LSSDataUICommon.XmlSerializers.dll	Pass	Pass	Pass
LSSDataWriter.dll	Pass	Pass	Pass
LSSDBAccessCL.dll	Pass	Pass	Pass
LSSDBAccessCommonInfo.dll	Pass	Pass	Pass
LSSDBAccessCommonInfo.XmlSerializers.dll	Pass	Pass	Pass
LSSDBAccessSV.dll	Pass	Pass	Pass
LSSDBAdminRevokeTool.exe	Pass	Pass	Pass
LSSDbCsMigrationCommon.dll	Pass	Pass	Pass
LSSDbExtensionForm.exe	Pass	Pass	Pass
LSSDbExtensionLibrary.dll	Pass	Pass	Pass
LSSDbExtensionMigrationTool.exe	Pass	Pass	Pass
LSSDBPasswordChangeTool.exe	Pass	Pass	Pass
LSSDbPatchForm.exe	Pass	Pass	Pass
LSSDefineSoftware.exe	Pass	Pass	Pass
LSSDefineSoftware.exe.manifest	Pass	Pass	Pass
LSSDefineSoftwareCommonInfo.dll	Pass	Pass	Pass
LSSDLog.dll	Pass	Pass	Pass
LSSDLogArchiver.exe	Pass	Pass	Pass
LSSDsoFileOperator.dll	Pass	Pass	Pass
LSSEventMail.dll	Pass	Pass	Pass
LSSEventMailSV.dll	Pass	Pass	Pass
LSSExtendDBController.exe	Pass	Pass	Pass
LSSFileChecker.dll	Pass	Pass	Pass
LSSFileTransCL.dll	Pass	Pass	Pass
LSSFileTransCommonInfo.dll	Pass	Pass	Pass
LSSFileTransCommonInfo.XmlSerializers.dll	Pass	Pass	Pass

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===== Shimadzu LabSolutions Check the Program Files Report =====

LSSFileTransSV.dll	Pass	Pass	Pass
LSSFingerPrintManager.exe	Pass	Pass	Pass
LSSFingerPrintManager.exe.manifest	Pass	Pass	Pass
LSSFLBackup.exe	Pass	Pass	Pass
LSSFLRestore.exe	Pass	Pass	Pass
LSSForcedLogout.exe	Pass	Pass	Pass
LSSForcedLogout.exe.manifest	Pass	Pass	Pass
LSSIndexOptimizeTool.exe	Pass	Pass	Pass
LSSInputAuditTrailForm.dll	Pass	Pass	Pass
LSSInstInfoFilePackageConversion.exe	Pass	Pass	Pass
LSSInstInfoFilePackageConversion.XmlSerializers.dll	Pass	Pass	Pass
LSSInstrumentCondition.dll	Pass	Pass	Pass
LSSInstrumentConditionAcqManagerCL.dll	Pass	Pass	Pass
LSSInstrumentConditionAcqMng.dll	Pass	Pass	Pass
LSSInstrumentConditionAcqMngHost.exe	Pass	Pass	Pass
LSSInstrumentConditionAcqSV.dll	Pass	Pass	Pass
LSSInstrumentConditionCommon.dll	Pass	Pass	Pass
LSSInstrumentConditionCommonInfo.dll	Pass	Pass	Pass
LSSInstrumentConditionCommonInfo.XmlSerializers.dll	Pass	Pass	Pass
LSSInstrumentConditionLssCL.dll	Pass	Pass	Pass
LSSInstrumentConditionLssMng.dll	Pass	Pass	Pass
LSSInstrumentConditionLssSV.dll	Pass	Pass	Pass
LSSInstrumentConditionWCF.Client.dll	Pass	Pass	Pass
LSSInstrumentConditionWCF.Common.dll	Pass	Pass	Pass
LSSInstrumentConditionWCF.Service.dll	Pass	Pass	Pass
LSSInstrumentFileImport.exe	Pass	Pass	Pass
LSSInstrumentManager.exe	Pass	Pass	Pass
LSSInstrumentManager.exe.manifest	Pass	Pass	Pass
LSSInstrumentManagerSV.dll	Pass	Pass	Pass
LSSLauncher.dll	Pass	Pass	Pass
LSSLauncherLite.exe	Pass	Pass	Pass
LSSLaunchingManager.exe	Pass	Pass	Pass
LSSLicenseInfoMngCommonInfo.dll	Pass	Pass	Pass
LSSLicenseInfoSV.dll	Pass	Pass	Pass
LSSLimsAssist.exe	Pass	Pass	Pass
LSSLimsAssistService.exe	Pass	Pass	Pass
LSSLimsCommonInfo.dll	Pass	Pass	Pass
LSSLimsCommonInfo.XmlSerializers.dll	Pass	Pass	Pass
LSSLimsInterface.exe	Pass	Pass	Pass
LSSLimsInterfaceService.exe	Pass	Pass	Pass
LSSLimsSetting.exe	Pass	Pass	Pass
LSSLimsSetting.exe.manifest	Pass	Pass	Pass
LSSLocalLog.mdb.Template	Pass	Pass	Pass
LSSLogBrowser.exe	Pass	Pass	Pass
LSSLogBrowser.exe.manifest	Pass	Pass	Pass
LSSLogCyclicRegister.dll	Pass	Pass	Pass
LSSLogDBAccess.exe	Pass	Pass	Pass
LSSLoginUserManager.dll	Pass	Pass	Pass
LSSLoginUserManager.exe	Pass	Pass	Pass
LSSLoginUserManager.exe.manifest	Pass	Pass	Pass
LSSLogManagerCL.dll	Pass	Pass	Pass
LSSLogManagerSV.dll	Pass	Pass	Pass
LSSMainWindow.exe	Pass	Pass	Pass
LSSMainWindow.exe.manifest	Pass	Pass	Pass
LSSMainWindowCommonInfo.dll	Pass	Pass	Pass
LSSMainWindowCommonInfo.XmlSerializers.dll	Pass	Pass	Pass
LSSMdbMigration.exe	Pass	Pass	Pass
LSSMngMsg.dll	Pass	Pass	Pass
LSSMngProxy.exe	Pass	Pass	Pass
LSSMngProxyRemotingObject.dll	Pass	Pass	Pass
LSSMngTools.dll	Pass	Pass	Pass
LSSMngToolsUI.dll	Pass	Pass	Pass
LSSMsgWrapper.dll	Pass	Pass	Pass

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===== Shimadzu LabSolutions Check the Program Files Report =====

LSSMultiDataExcelFile.dll	Pass	Pass	Pass
LSSMultiDataRegisterSettingCL.dll	Pass	Pass	Pass
LSSMultiDataRegisterSettingCommon.dll	Pass	Pass	Pass
LSSMultiDataRegisterSettingCommon.XmlSerializers.dll	Pass	Pass	Pass
LSSMultiDataRegisterSettingCommonFunc.dll	Pass	Pass	Pass
LSSMultiDataRegisterSettingSV.dll	Pass	Pass	Pass
LSSMultiDataReportCL.dll	Pass	Pass	Pass
LSSMultiDataReportCommonInfo.dll	Pass	Pass	Pass
LSSMultiDataReportConfiguration.exe	Pass	Pass	Pass
LSSMultiDataReportConfiguration.exe.manifest	Pass	Pass	Pass
LSSNamedPipeClientToAnalysis.dll	Pass	Pass	Pass
LSSNetworkPrint.dll	Pass	Pass	Pass
LSSNetworkPrintCL.dll	Pass	Pass	Pass
LSSNetworkPrintCommonInfo.dll	Pass	Pass	Pass
LSSNetworkPrintCommonInfo.XmlSerializers.dll	Pass	Pass	Pass
LSSNetworkPrintHost.exe	Pass	Pass	Pass
LSSNetworkPrintManagerCL.dll	Pass	Pass	Pass
LSSNetworkPrintManagerSV.dll	Pass	Pass	Pass
LSSNetworkPrintService.exe	Pass	Pass	Pass
LSSNetworkPrintSV.dll	Pass	Pass	Pass
LSSObstacleManager.dll	Pass	Pass	Pass
LSSObstacleManagerCommonInfo.dll	Pass	Pass	Pass
LSSObstacleManagerCommonInfo.XmlSerializers.dll	Pass	Pass	Pass
LSSObstacleMeasuresInfoWatch.dll	Pass	Pass	Pass
LSSPCinfoDisp.exe	Pass	Pass	Pass
LSSPCinfoDisp.exe.manifest	Pass	Pass	Pass
LSSPcInfoForm.exe.manifest	Pass	Pass	Pass
LSSPcInfoManagerCL.dll	Pass	Pass	Pass
LSSPcInfoManagerSV.dll	Pass	Pass	Pass
LSSPrinterManager.exe	Pass	Pass	Pass
LSSPrinterManager.exe.manifest	Pass	Pass	Pass
LSSPrintPreview.dll	Pass	Pass	Pass
LSSProcessController.exe	Pass	Pass	Pass
LSSProcessManager.dll	Pass	Pass	Pass
LSSProfileDBAccess.exe	Pass	Pass	Pass
LSSProfileDBAccessCommonInfo.dll	Pass	Pass	Pass
LSSProfileInfoManagerSV.dll	Pass	Pass	Pass
LSSProgChk.exe	Pass	Pass	Pass
LSSProgChk.exe.manifest	Pass	Pass	Pass
LSSProgChkSV.dll	Pass	Pass	Pass
LSSProjectManager.exe	Pass	Pass	Pass
LSSProjectManager.exe.manifest	Pass	Pass	Pass
LSSProjectManagerSV.dll	Pass	Pass	Pass
LSSProjectPolicyForm.dll	Pass	Pass	Pass
LSSProjectSettingForm.dll	Pass	Pass	Pass
LSSRAS.dll	Pass	Pass	Pass
LSSRASCommonInfo.dll	Pass	Pass	Pass
LSSRASCommonInfo.XmlSerializers.dll	Pass	Pass	Pass
LSSRASManager.dll	Pass	Pass	Pass
LSSRASManager.exe	Pass	Pass	Pass
LSSRASService.exe	Pass	Pass	Pass
LSSRegisterPcInfo.exe	Pass	Pass	Pass
LSSReleaseLockoutPc.exe	Pass	Pass	Pass
LSSReleaseLockoutPc.exe.manifest	Pass	Pass	Pass
LSSReleaseLockoutUser.exe	Pass	Pass	Pass
LSSReleaseLockoutUser.exe.manifest	Pass	Pass	Pass
LSSRemoteControllerCL.dll	Pass	Pass	Pass
LSSRemoteControllerCommonInfo.dll	Pass	Pass	Pass
LSSRemoteControllerCommonInfo.XmlSerializers.dll	Pass	Pass	Pass
LSSRemoteControllerSorting.dll	Pass	Pass	Pass
LSSRemoteControllerSV.dll	Pass	Pass	Pass
LSSReportGenerator.dll	Pass	Pass	Pass
LSSRestore.exe	Pass	Pass	Pass

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===== Shimadzu LabSolutions Check the Program Files Report =====

LSSRestore.exe.manifest	Pass	Pass	Pass
LSSRestore.XmlSerializers.dll	Pass	Pass	Pass
LSSRightsGroupManager.exe	Pass	Pass	Pass
LSSRightsGroupManager.exe.manifest	Pass	Pass	Pass
LSSSendEventSetting.dll	Pass	Pass	Pass
LSSSendEventSettingCL.dll	Pass	Pass	Pass
LSSSendEventSettingForm.dll	Pass	Pass	Pass
LSSSendEventSettingSV.dll	Pass	Pass	Pass
LSSService.exe	Pass	Pass	Pass
LSSService.exe.manifest	Pass	Pass	Pass
LSSServiceController.exe	Pass	Pass	Pass
LSSServiceMonitor.exe	Pass	Pass	Pass
LSSSetDbConnection.exe	Pass	Pass	Pass
LSSSetDbConnection.exe.manifest	Pass	Pass	Pass
LSSSetMdbForm.exe	Pass	Pass	Pass
LSSSetMdbForm.exe.manifest	Pass	Pass	Pass
LSSSetPrinterInfoDialog.dll	Pass	Pass	Pass
LSSSetupDbConnectionCL.dll	Pass	Pass	Pass
LSSSetupDbConnectionCommonInfo.dll	Pass	Pass	Pass
LSSSetupDbConnectionSV.dll	Pass	Pass	Pass
LSSSetupMdbCommonInfo.dll	Pass	Pass	Pass
LSSSetupMdbCommonInfo.XmlSerializers.dll	Pass	Pass	Pass
LSSSmzAtstEx.ocx	Pass	Pass	Pass
LSSSmzAtstExAdapter.dll	Pass	Pass	Pass
LSSSortingCL.dll	Pass	Pass	Pass
LSSSortingController.exe	Pass	Pass	Pass
LSSSortingManager.dll	Pass	Pass	Pass
LSSSortingSV.dll	Pass	Pass	Pass
LSSSpreadReportCommonInfo.dll	Pass	Pass	Pass
LSSSpreadReportCreaterCL.dll	Pass	Pass	Pass
LSSSpreadReportCreaterSV.exe	Pass	Pass	Pass
LSSSpreadReportTemplateEditor.exe	Pass	Pass	Pass
LSSSpreadReportTemplateEditorForm.dll	Pass	Pass	Pass
LSSSqlAccess.dll	Pass	Pass	Pass
LSSSqlConversion.exe	Pass	Pass	Pass
LSSSysProjSettingCommonInfo.dll	Pass	Pass	Pass
LSSSysProjSettingManagerSV.dll	Pass	Pass	Pass
LSSSystemBackup.exe	Pass	Pass	Pass
LSSSystemBackup_diff.bat	Pass	Pass	Pass
LSSSystemBackupRestore.dll	Pass	Pass	Pass
LSSSystemDBAccess.exe	Pass	Pass	Pass
LSSSystemInfoPrint.exe	Pass	Pass	Pass
LSSSystemInfoPrint.exe.manifest	Pass	Pass	Pass
LSSSystemManager.exe	Pass	Pass	Pass
LSSSystemManagerCL.dll	Pass	Pass	Pass
LSSSystemManagerCL.XmlSerializers.dll	Pass	Pass	Pass
LSSSystemPolicy.exe	Pass	Pass	Pass
LSSSystemPolicy.exe.manifest	Pass	Pass	Pass
LSSSystemPolicyCommonInfo.dll	Pass	Pass	Pass
LSSSystemPolicySV.dll	Pass	Pass	Pass
LSSSystemRestore.exe	Pass	Pass	Pass
LSSSystemSetting.exe	Pass	Pass	Pass
LSSSystemSetting.exe.manifest	Pass	Pass	Pass
LSSUICommon.dll	Pass	Pass	Pass
LSSUnregDataManager.exe	Pass	Pass	Pass
LSSUnregDataManager.XmlSerializers.dll	Pass	Pass	Pass
LSSUpdateObstacleDBAcq.exe	Pass	Pass	Pass
LSSUpdateObstacleDBLss.exe	Pass	Pass	Pass
LSSUpdateObstacleWCF.Client.dll	Pass	Pass	Pass
LSSUpdateObstacleWCF.Common.dll	Pass	Pass	Pass
LSSUpdateObstacleWCF.Service.dll	Pass	Pass	Pass
LSSUserGroupManager.exe	Pass	Pass	Pass
LSSUserGroupManager.exe.manifest	Pass	Pass	Pass

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===== Shimadzu LabSolutions Check the Program Files Report =====

LSSUserManager.exe	Pass	Pass	Pass
LSSUserManager.exe.manifest	Pass	Pass	Pass
LSSUserManagerSV.dll	Pass	Pass	Pass
LSSValidationSupportCommonInfo.dll	Pass	Pass	Pass
LSSValidationSupportCommonInfo.XmlSerializers.dll	Pass	Pass	Pass
LSSWCFHelper.dll	Pass	Pass	Pass
LSSWebBrowser.exe	Pass	Pass	Pass
LSSWin32.dll	Pass	Pass	Pass
LSSWindowLockMng.dll	Pass	Pass	Pass
LSSWindowLockMngSV.dll	Pass	Pass	Pass
LSSWindowsDomainAccessService.exe	Pass	Pass	Pass
LSSWorkFolderCleaner.exe	Pass	Pass	Pass
lwf_jp2.dll	Pass	Pass	Pass
NLog.dll	Pass	Pass	Pass
nrmluser.bmp	Pass	Pass	Pass
Oracle.ManagedDataAccess.dll	Pass	Pass	Pass
Oracle.ManagedDataAccess.EntityFramework.dll	Pass	Pass	Pass
PkuiCom.dll	Pass	Pass	Pass
policy.6.0.FarPoint.Win.dll	Pass	Pass	Pass
policy.6.0.FarPoint.Win.Spread.dll	Pass	Pass	Pass
QueMng.mdb.Template	Pass	Pass	Pass
RightsFilterConfig_000.xml	Pass	Pass	Pass
Shimadzu.iQLinks.WebApi.Client.dll	Pass	Pass	Pass
Shimadzu.iQLinks.WebApi.Common.dll	Pass	Pass	Pass
Shimadzu.LabSolutions.Frameworks.dll	Pass	Pass	Pass
SkyPDFAPI.dll	Pass	Pass	Pass
SkyPDFCacheFactory.dll	Pass	Pass	Pass
SkyPDFColorSpaceFactory.dll	Pass	Pass	Pass
SkyPDFCore.dll	Pass	Pass	Pass
SkyPDFDocument.dll	Pass	Pass	Pass
SkyPDFFilterEncoder.dll	Pass	Pass	Pass
SkyPDFFontManager.dll	Pass	Pass	Pass
SkyPDFManager.dll	Pass	Pass	Pass
SkyPDFPreFlight.dll	Pass	Pass	Pass
SkyPDFRenderer.dll	Pass	Pass	Pass
SkyPDFSecurityHandlerFactory.dll	Pass	Pass	Pass
SkyPDFToolsSDK.sdkIng_en.dll	Pass	Pass	Pass
SkyPDFToolsSDK.sdkIng_jp.dll	Pass	Pass	Pass
SkyPDFValidator.dll	Pass	Pass	Pass
SkyPDFWriterLib.dll	Pass	Pass	Pass
SkySignature.dll	Pass	Pass	Pass
SkyViewCOM.dll	Pass	Pass	Pass
SkyViewCOM.dll.intermediate.manifest	Pass	Pass	Pass
SmzAtst.lic	Pass	Pass	Pass
sqlceca35.dll	Pass	Pass	Pass
sqlcecompact35.dll	Pass	Pass	Pass
sqlceer35EN.dll	Pass	Pass	Pass
sqlceme35.dll	Pass	Pass	Pass
sqlceoledb35.dll	Pass	Pass	Pass
sqlceqp35.dll	Pass	Pass	Pass
sqlcese35.dll	Pass	Pass	Pass
Stingray.GridControl70.dll	Pass	Pass	Pass
Stingray.GridControl71.dll	Pass	Pass	Pass
Stingray.GridUtils70.dll	Pass	Pass	Pass
Stingray.GridUtils71.dll	Pass	Pass	Pass
sx32w.dll	Pass	Pass	Pass
System.Data.SqlServerCe.dll	Pass	Pass	Pass
System.Data.SqlServerCe.Entity.dll	Pass	Pass	Pass
UNLHA32.DLL	Pass	Pass	Pass
UNLHA32.TXT	Pass	Pass	Pass
vrfdllR.dll	Pass	Pass	Pass
zlib1.dll	Pass	Pass	Pass
83pv-RKSJ-H.bin	Pass	Pass	Pass

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===== Shimadzu LabSolutions Check the Program Files Report =====

90msp-RKSJ-H.bin	Pass	Pass	Pass
90msp-RKSJ-V.bin	Pass	Pass	Pass
90ms-RKSJ-H.bin	Pass	Pass	Pass
90ms-RKSJ-UCS2.bin	Pass	Pass	Pass
90ms-RKSJ-V.bin	Pass	Pass	Pass
90pv-RKSJ-H.bin	Pass	Pass	Pass
90pv-RKSJ-UCS2.bin	Pass	Pass	Pass
90pv-RKSJ-UCS2C.bin	Pass	Pass	Pass
Add-RKSJ-H.bin	Pass	Pass	Pass
Add-RKSJ-V.bin	Pass	Pass	Pass
Adobe-CNS1-3.bin	Pass	Pass	Pass
Adobe-CNS1-UCS2.bin	Pass	Pass	Pass
Adobe-GB1-4.bin	Pass	Pass	Pass
Adobe-GB1-UCS2.bin	Pass	Pass	Pass
Adobe-Japan1-4.bin	Pass	Pass	Pass
Adobe-Japan1-UCS2.bin	Pass	Pass	Pass
Adobe-Korea1-2.bin	Pass	Pass	Pass
Adobe-Korea1-UCS2.bin	Pass	Pass	Pass
B5pc-H.bin	Pass	Pass	Pass
B5pc-UCS2.bin	Pass	Pass	Pass
B5pc-UCS2C.bin	Pass	Pass	Pass
B5pc-V.bin	Pass	Pass	Pass
CNS-EUC-H.bin	Pass	Pass	Pass
CNS-EUC-V.bin	Pass	Pass	Pass
ETen-B5-H.bin	Pass	Pass	Pass
ETen-B5-UCS2.bin	Pass	Pass	Pass
ETen-B5-V.bin	Pass	Pass	Pass
EUC-H.bin	Pass	Pass	Pass
EUC-V.bin	Pass	Pass	Pass
Ext-RKSJ-H.bin	Pass	Pass	Pass
Ext-RKSJ-V.bin	Pass	Pass	Pass
GB-EUC-H.bin	Pass	Pass	Pass
GB-EUC-V.bin	Pass	Pass	Pass
GBK2K-H.bin	Pass	Pass	Pass
GBK2K-V.bin	Pass	Pass	Pass
GBK-EUC-H.bin	Pass	Pass	Pass
GBK-EUC-UCS2.bin	Pass	Pass	Pass
GBK-EUC-V.bin	Pass	Pass	Pass
GBKp-EUC-H.bin	Pass	Pass	Pass
GBKp-EUC-V.bin	Pass	Pass	Pass
GBpc-EUC-H.bin	Pass	Pass	Pass
GBpc-EUC-UCS2.bin	Pass	Pass	Pass
GBpc-EUC-UCS2C.bin	Pass	Pass	Pass
GBpc-EUC-V.bin	Pass	Pass	Pass
GBT-EUC-H.bin	Pass	Pass	Pass
GBT-EUC-V.bin	Pass	Pass	Pass
H.bin	Pass	Pass	Pass
HKscs-B5-H.bin	Pass	Pass	Pass
HKscs-B5-V.bin	Pass	Pass	Pass
Identity-H.bin	Pass	Pass	Pass
Identity-V.bin	Pass	Pass	Pass
KSC-EUC-H.bin	Pass	Pass	Pass
KSC-EUC-V.bin	Pass	Pass	Pass
KSCms-UHC-H.bin	Pass	Pass	Pass
KSCms-UHC-HW-H.bin	Pass	Pass	Pass
KSCms-UHC-HW-V.bin	Pass	Pass	Pass
KSCms-UHC-UCS2.bin	Pass	Pass	Pass
KSCms-UHC-V.bin	Pass	Pass	Pass
KSCpc-EUC-H.bin	Pass	Pass	Pass
KSCpc-EUC-UCS2.bin	Pass	Pass	Pass
KSCpc-EUC-UCS2C.bin	Pass	Pass	Pass
UniCNS-UCS2-H.bin	Pass	Pass	Pass
UniCNS-UCS2-V.bin	Pass	Pass	Pass

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===== Shimadzu LabSolutions Check the Program Files Report =====

UniGB-UCS2-H.bin	Pass	Pass	Pass
UniGB-UCS2-V.bin	Pass	Pass	Pass
UniJIS-UCS2-H.bin	Pass	Pass	Pass
UniJIS-UCS2-HW-H.bin	Pass	Pass	Pass
UniJIS-UCS2-HW-V.bin	Pass	Pass	Pass
UniJIS-UCS2-V.bin	Pass	Pass	Pass
UniKS-UCS2-H.bin	Pass	Pass	Pass
UniKS-UCS2-V.bin	Pass	Pass	Pass
V.bin	Pass	Pass	Pass
83pv-RKSJ-H.bin	Pass	Pass	Pass
90msp-RKSJ-H.bin	Pass	Pass	Pass
90msp-RKSJ-V.bin	Pass	Pass	Pass
90ms-RKSJ-H.bin	Pass	Pass	Pass
90ms-RKSJ-UCS2.bin	Pass	Pass	Pass
90ms-RKSJ-V.bin	Pass	Pass	Pass
90pv-RKSJ-H.bin	Pass	Pass	Pass
90pv-RKSJ-UCS2.bin	Pass	Pass	Pass
90pv-RKSJ-UCS2C.bin	Pass	Pass	Pass
Add-RKSJ-H.bin	Pass	Pass	Pass
Add-RKSJ-V.bin	Pass	Pass	Pass
Adobe-CNS1-3.bin	Pass	Pass	Pass
Adobe-CNS1-UCS2.bin	Pass	Pass	Pass
Adobe-GB1-4.bin	Pass	Pass	Pass
Adobe-GB1-UCS2.bin	Pass	Pass	Pass
Adobe-Identity-UCS2.bin	Pass	Pass	Pass
Adobe-Japan1-4.bin	Pass	Pass	Pass
Adobe-Japan1-UCS2.bin	Pass	Pass	Pass
Adobe-Japan1-UCS2_4.bin	Pass	Pass	Pass
Adobe-Korea1-2.bin	Pass	Pass	Pass
Adobe-Korea1-UCS2.bin	Pass	Pass	Pass
B5pc-H.bin	Pass	Pass	Pass
B5pc-UCS2.bin	Pass	Pass	Pass
B5pc-UCS2C.bin	Pass	Pass	Pass
B5pc-V.bin	Pass	Pass	Pass
CNS-EUC-H.bin	Pass	Pass	Pass
CNS-EUC-V.bin	Pass	Pass	Pass
ETen-B5-H.bin	Pass	Pass	Pass
ETen-B5-UCS2.bin	Pass	Pass	Pass
ETen-B5-V.bin	Pass	Pass	Pass
ETenms-B5-H.bin	Pass	Pass	Pass
ETenms-B5-V.bin	Pass	Pass	Pass
EUC-H.bin	Pass	Pass	Pass
EUC-V.bin	Pass	Pass	Pass
Ext-RKSJ-H.bin	Pass	Pass	Pass
Ext-RKSJ-V.bin	Pass	Pass	Pass
GB-EUC-H.bin	Pass	Pass	Pass
GB-EUC-V.bin	Pass	Pass	Pass
GBK2K-H.bin	Pass	Pass	Pass
GBK2K-V.bin	Pass	Pass	Pass
GBK-EUC-H.bin	Pass	Pass	Pass
GBK-EUC-UCS2.bin	Pass	Pass	Pass
GBK-EUC-V.bin	Pass	Pass	Pass
GBKp-EUC-H.bin	Pass	Pass	Pass
GBKp-EUC-V.bin	Pass	Pass	Pass
GBpc-EUC-H.bin	Pass	Pass	Pass
GBpc-EUC-UCS2.bin	Pass	Pass	Pass
GBpc-EUC-UCS2C.bin	Pass	Pass	Pass
GBpc-EUC-V.bin	Pass	Pass	Pass
GBT-EUC-H.bin	Pass	Pass	Pass
GBT-EUC-V.bin	Pass	Pass	Pass
H.bin	Pass	Pass	Pass
HKscs-B5-H.bin	Pass	Pass	Pass
HKscs-B5-V.bin	Pass	Pass	Pass

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===== Shimadzu LabSolutions Check the Program Files Report =====

Identity-H.bin	Pass	Pass	Pass
Identity-V.bin	Pass	Pass	Pass
KSC-EUC-H.bin	Pass	Pass	Pass
KSC-EUC-V.bin	Pass	Pass	Pass
KSCms-UHC-H.bin	Pass	Pass	Pass
KSCms-UHC-HW-H.bin	Pass	Pass	Pass
KSCms-UHC-HW-V.bin	Pass	Pass	Pass
KSCms-UHC-UCS2.bin	Pass	Pass	Pass
KSCms-UHC-V.bin	Pass	Pass	Pass
KSCpc-EUC-H.bin	Pass	Pass	Pass
KSCpc-EUC-UCS2.bin	Pass	Pass	Pass
KSCpc-EUC-UCS2C.bin	Pass	Pass	Pass
UniCNS-UCS2-H.bin	Pass	Pass	Pass
UniCNS-UCS2-V.bin	Pass	Pass	Pass
UniCNS-UTF16-H.bin	Pass	Pass	Pass
UniCNS-UTF16-V.bin	Pass	Pass	Pass
UniGB-UCS2-H.bin	Pass	Pass	Pass
UniGB-UCS2-V.bin	Pass	Pass	Pass
UniGB-UTF16-H.bin	Pass	Pass	Pass
UniGB-UTF16-V.bin	Pass	Pass	Pass
UniJIS-UCS2-H.bin	Pass	Pass	Pass
UniJIS-UCS2-HW-H.bin	Pass	Pass	Pass
UniJIS-UCS2-HW-V.bin	Pass	Pass	Pass
UniJIS-UCS2-V.bin	Pass	Pass	Pass
UniJIS-UTF16-H.bin	Pass	Pass	Pass
UniJIS-UTF16-V.bin	Pass	Pass	Pass
UniKS-UCS2-H.bin	Pass	Pass	Pass
UniKS-UCS2-V.bin	Pass	Pass	Pass
UniKS-UTF16-H.bin	Pass	Pass	Pass
UniKS-UTF16-V.bin	Pass	Pass	Pass
V.bin	Pass	Pass	Pass
AdobeRGB1998.icc	Pass	Pass	Pass
AppleRGB.icc	Pass	Pass	Pass
CoatedFOGRA27.icc	Pass	Pass	Pass
CoatedFOGRA39.icc	Pass	Pass	Pass
CoatedGRACoL2006.icc	Pass	Pass	Pass
ColorMatchRGB.icc	Pass	Pass	Pass
JapanColor2001Coated.icc	Pass	Pass	Pass
JapanColor2001Uncoated.icc	Pass	Pass	Pass
JapanColor2002Newspaper.icc	Pass	Pass	Pass
JapanColor2003WebCoated.icc	Pass	Pass	Pass
JapanWebCoated.icc	Pass	Pass	Pass
sRGB_IEC61966-2-1_black_scaled.icc	Pass	Pass	Pass
UncoatedFOGRA29.icc	Pass	Pass	Pass
USWebCoatedSWOP.icc	Pass	Pass	Pass
USWebUncoated.icc	Pass	Pass	Pass
WebCoatedFOGRA28.icc	Pass	Pass	Pass
WebCoatedSWOP2006Grade3.icc	Pass	Pass	Pass
WebCoatedSWOP2006Grade5.icc	Pass	Pass	Pass
SkyPKISecurity.sppi	Pass	Pass	Pass
SkySigRegular.sppi	Pass	Pass	Pass
dsofile.dll	Pass	Pass	Pass
LSSDsoInfoOperator_x64.exe	Pass	Pass	Pass

Program Name: LabSolutions Mng FL
Version: 1.122
Date Checked: 28/11/2568 11:09:54(+07:00)
PC Information: Stand-alone PC(DESKTOP-5ULUA14)

File Name	File Size	File Date	Check Sum
LSSLicenseMergeTool.exe	Pass	Pass	Pass

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===== Shimadzu LabSolutions Check the Program Files Report =====

Program Name: LabSolutions Log Collection Tool
Version: 1.1.0
Date Checked: 28/11/2568 11:09:54(+07:00)
PC Information: Stand-alone PC(DESKTOP-5ULUA14)

File Name	File Size	File Date	Check Sum
7za.exe	Pass	Pass	Pass
BetterFolderBrowser.dll	Pass	Pass	Pass
BetterFolderBrowser.xml	Pass	Pass	Pass
CsvHelper.dll	Pass	Pass	Pass
CsvHelper.xml	Pass	Pass	Pass
Google.Protobuf.dll	Pass	Pass	Pass
Google.Protobuf.xml	Pass	Pass	Pass
Grpc.Core.Api.dll	Pass	Pass	Pass
Grpc.Core.Api.xml	Pass	Pass	Pass
Grpc.Core.dll	Pass	Pass	Pass
Grpc.Core.xml	Pass	Pass	Pass
grpc_csharp_ext.x64.dll	Pass	Pass	Pass
grpc_csharp_ext.x86.dll	Pass	Pass	Pass
libgrpc_csharp_ext.x64.dylib	Pass	Pass	Pass
libgrpc_csharp_ext.x64.so	Pass	Pass	Pass
libgrpc_csharp_ext.x86.dylib	Pass	Pass	Pass
libgrpc_csharp_ext.x86.so	Pass	Pass	Pass
LogCollectionTool.Data.dll	Pass	Pass	Pass
LogCollectionTool.exe	Pass	Pass	Pass
LogCollectionToolSV.exe	Pass	Pass	Pass
ReactiveProperty.dll	Pass	Pass	Pass
ReactiveProperty.NET46.dll	Pass	Pass	Pass
ReactiveProperty.NET46.xml	Pass	Pass	Pass
ReactiveProperty.xml	Pass	Pass	Pass
System.Buffers.dll	Pass	Pass	Pass
System.Buffers.xml	Pass	Pass	Pass
System.Memory.dll	Pass	Pass	Pass
System.Memory.xml	Pass	Pass	Pass
System.Numerics.Vectors.dll	Pass	Pass	Pass
System.Numerics.Vectors.xml	Pass	Pass	Pass
System.Reactive.Core.dll	Pass	Pass	Pass
System.Reactive.Core.xml	Pass	Pass	Pass
System.Reactive.dll	Pass	Pass	Pass
System.Reactive.Interfaces.dll	Pass	Pass	Pass
System.Reactive.Interfaces.xml	Pass	Pass	Pass
System.Reactive.Linq.dll	Pass	Pass	Pass
System.Reactive.Linq.xml	Pass	Pass	Pass
System.Reactive.xml	Pass	Pass	Pass
System.Runtime.CompilerServices.Unsafe.dll	Pass	Pass	Pass
System.Runtime.CompilerServices.Unsafe.xml	Pass	Pass	Pass
System.Threading.Tasks.Extensions.dll	Pass	Pass	Pass
System.Threading.Tasks.Extensions.xml	Pass	Pass	Pass
System.ValueTuple.dll	Pass	Pass	Pass
System.ValueTuple.xml	Pass	Pass	Pass
Xceed.Wpf.Toolkit.dll	Pass	Pass	Pass

Program Name: IR Pilot
Version: 1.11
Date Checked: 28/11/2568 11:09:54(+07:00)
PC Information: Stand-alone PC(DESKTOP-5ULUA14)

File Name	File Size	File Date	Check Sum
IRPilot.exe	Pass	Pass	Pass
IRPilotInstaller.exe	Pass	Pass	Pass

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===== Shimadzu LabSolutions Check the Program Files Report =====

IRPilot.resources.dll	Pass	Pass	Pass
IRPilot.resources.dll	Pass	Pass	Pass
IRPilot.resources.dll	Pass	Pass	Pass
32880IRPilot.bas	Pass	Pass	Pass
32880IRPilot.icsq	Pass	Pass	Pass

Program Name: LabSolutions IR
Version: 2.34
Date Checked: 28/11/2568 11:09:54(+07:00)
PC Information: Stand-alone PC(DESKTOP-5ULUA14)

File Name	File Size	File Date	Check Sum
IRsolution.exe	Pass	Pass	Pass
1394Comm.dll	Pass	Pass	Pass
AIM8800R.dll	Pass	Pass	Pass
Aspipr32.dll	Pass	Pass	Pass
AtmosphereCorrectionR.dll	Pass	Pass	Pass
BasicR.dll	Pass	Pass	Pass
btreer.dll	Pass	Pass	Pass
ContainerManagerR.dll	Pass	Pass	Pass
ConvertLibsR.exe	Pass	Pass	Pass
DataExtractorR.dll	Pass	Pass	Pass
DpobjectR.dll	Pass	Pass	Pass
dpObjectXR.dll	Pass	Pass	Pass
Dpomathr.dll	Pass	Pass	Pass
dpoMathExR.dll	Pass	Pass	Pass
dpoMathExXR.dll	Pass	Pass	Pass
dpoMathFFTR.dll	Pass	Pass	Pass
dpoMathXR.dll	Pass	Pass	Pass
FTIR2000R.dll	Pass	Pass	Pass
FTIR8000R.dll	Pass	Pass	Pass
FTIRBaseR.dll	Pass	Pass	Pass
FTIRCM32.dll	Pass	Pass	Pass
GenToolsR.dll	Pass	Pass	Pass
GuiBasicR.dll	Pass	Pass	Pass
guiCalcR.dll	Pass	Pass	Pass
guiFilesR.dll	Pass	Pass	Pass
GuiSearchR.dll	Pass	Pass	Pass
IRCmd232.dll	Pass	Pass	Pass
IRCmd232U.dll	Pass	Pass	Pass
LabSolMngrR.dll	Pass	Pass	Pass
lcAccessFileR.dll	Pass	Pass	Pass
Lcadminr.dll	Pass	Pass	Pass
lcAdminXR.dll	Pass	Pass	Pass
lcHLAccessFileR.dll	Pass	Pass	Pass
lcInstrumentR.dll	Pass	Pass	Pass
LcmathexR.dll	Pass	Pass	Pass
LcmathR.dll	Pass	Pass	Pass
lcSerialPortR.dll	Pass	Pass	Pass
lcutilr.dll	Pass	Pass	Pass
MoleculeR.dll	Pass	Pass	Pass
ObjectToolsR.dll	Pass	Pass	Pass
ObjectViewerR.dll	Pass	Pass	Pass
og1220as.dll	Pass	Pass	Pass
ot1220as.dll	Pass	Pass	Pass
ParameterR.dll	Pass	Pass	Pass
PrintManagerR.dll	Pass	Pass	Pass
PrintManagerXR.dll	Pass	Pass	Pass
QuantR.dll	Pass	Pass	Pass
RWUXThemeS15.dll	Pass	Pass	Pass
SadtlerSearchR.dll	Pass	Pass	Pass
SCSIComm.dll	Pass	Pass	Pass

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===== Shimadzu LabSolutions Check the Program Files Report =====

SCSIPROT.DLL	Pass	Pass	Pass
SDBSDK.dll	Pass	Pass	Pass
SearchClientR.dll	Pass	Pass	Pass
SearchClientXR.dll	Pass	Pass	Pass
SearchR.dll	Pass	Pass	Pass
sfl1220as.dll	Pass	Pass	Pass
StingrayExtR.dll	Pass	Pass	Pass
SWDCalcR.dll	Pass	Pass	Pass
SZDropDownBtn.ocx	Pass	Pass	Pass
USBProt32.dll	Pass	Pass	Pass
UserManagementR.dll	Pass	Pass	Pass
WB9ENT.OCX	Pass	Pass	Pass
wgClassesR.dll	Pass	Pass	Pass
WinclassR.dll	Pass	Pass	Pass
WingraphR.dll	Pass	Pass	Pass
WinutilR.dll	Pass	Pass	Pass
WIRCmd232R.dll	Pass	Pass	Pass
wwb9@011.dll	Pass	Pass	Pass
wwb9@deu.dll	Pass	Pass	Pass
wwb9@esp.dll	Pass	Pass	Pass
wwb9@fra.dll	Pass	Pass	Pass
wwb9@ita.dll	Pass	Pass	Pass
wwb9@jpn.dll	Pass	Pass	Pass
wwb9@nor.dll	Pass	Pass	Pass
wwb9@ptb.dll	Pass	Pass	Pass
wwb9@rus.dll	Pass	Pass	Pass
wwb9@sve.dll	Pass	Pass	Pass
wwb9_32a.dll	Pass	Pass	Pass
wwb9_32w.dll	Pass	Pass	Pass
IRsolution.tlb	Pass	Pass	Pass
DataExtractorInfo.dll	Pass	Pass	Pass
IRLabSolUtl.dll	Pass	Pass	Pass
WideUse.dll	Pass	Pass	Pass
LabSolAssemblyLoader.dll	Pass	Pass	Pass
SecurityDLL.dll	Pass	Pass	Pass
DSCAP.ocx	Pass	Pass	Pass
IR_Agent.exe	Pass	Pass	Pass
Spectacle16R.dll	Pass	Pass	Pass
JcampR.dll	Pass	Pass	Pass
ASCIIR.dll	Pass	Pass	Pass
IRlauncher.exe	Pass	Pass	Pass
LabSolAssemblyLoader.dll	Pass	Pass	Pass
LibraryDecryptionAgent.dll	Pass	Pass	Pass
libDecryptLibrary.dll	Pass	Pass	Pass
libDecryptLibrary64.dll	Pass	Pass	Pass
libProtectionInfo.dll	Pass	Pass	Pass
libProtectionInfo64.dll	Pass	Pass	Pass
dd32.dll	Pass	Pass	Pass
dddbg64.dll	Pass	Pass	Pass
32870ASTM.icsq	Pass	Pass	Pass
32871JP.icsq	Pass	Pass	Pass
32872EP.icsq	Pass	Pass	Pass
32872USP.icsq	Pass	Pass	Pass
32873EasyScan.icsq	Pass	Pass	Pass
32874ReportViewer.icsq	Pass	Pass	Pass
32875PharmaReport.icsq	Pass	Pass	Pass
32877Identification.icsq	Pass	Pass	Pass
32878CHP.icsq	Pass	Pass	Pass
32879Compare.icsq	Pass	Pass	Pass
FMfromLauncher.icsq	Pass	Pass	Pass
FMfromProgram.icsq	Pass	Pass	Pass
32870ASTM.bas	Pass	Pass	Pass
32871JP.bas	Pass	Pass	Pass

===== Shimadzu LabSolutions Check the Program Files Report =====

32872EP.bas	Pass	Pass	Pass
32872USP.bas	Pass	Pass	Pass
32873EasyScan.bas	Pass	Pass	Pass
32874ReportViewer.bas	Pass	Pass	Pass
32876FM.bas	Pass	Pass	Pass
32878CHP.bas	Pass	Pass	Pass
32879Compare.bas	Pass	Pass	Pass
IdentificationTest.bas	Pass	Pass	Pass
Kyokuhou.bas	Pass	Pass	Pass
FoodAdditive.bas	Pass	Pass	Pass
FMfromLauncher.bas	Pass	Pass	Pass
FMfromProgram.bas	Pass	Pass	Pass
SDBSecurityTool.exe	Pass	Pass	Pass
BRFiltersSDBSDK.dll	Pass	Pass	Pass
MacroTools3.exe	Pass	Pass	Pass
LabSolCppPack.dll	Pass	Pass	Pass
LabSolCppPackRes.dll	Pass	Pass	Pass
IRParamViewer.exe	Pass	Pass	Pass
RapidScanDataR.dll	Pass	Pass	Pass
AIMPointDataR.dll	Pass	Pass	Pass
RapidScanDataImport.dll	Pass	Pass	Pass
AIMPointDataImport.dll	Pass	Pass	Pass
OmnicR.dll	Pass	Pass	Pass
PerkinElmerR.dll	Pass	Pass	Pass
Shimadzu.SpectroCommon.Logging.dll	Pass	Pass	Pass
Shimadzu.SpectroCommon.Logging.Cli.dll	Pass	Pass	Pass
NLog.dll	Pass	Pass	Pass
NLog.license.txt	Pass	Pass	Pass
Livet.dll	Pass	Pass	Pass
Livet.xml	Pass	Pass	Pass
Microsoft.Expression.Interactions.dll	Pass	Pass	Pass
Shimadzu.ClearUI.Wpf.dll	Pass	Pass	Pass
SpectrumCheck.exe	Pass	Pass	Pass
SpectrumCheck.exe.config	Pass	Pass	Pass
System.Windows.Interactivity.dll	Pass	Pass	Pass
System.Windows.Interactivity.resources.dll	Pass	Pass	Pass
SpectrumCheck.resources.dll	Pass	Pass	Pass
SpectrumCheck.resources.dll	Pass	Pass	Pass
System.Windows.Interactivity.resources.dll	Pass	Pass	Pass

Program Name: Easy Macro
Version: 1.10
Date Checked: 28/11/2568 11:09:54(+07:00)
PC Information: Stand-alone PC(DESKTOP-5ULUA14)

File Name	File Size	File Date	Check Sum
emt.exe	Pass	Pass	Pass
emtXML.dll	Pass	Pass	Pass
emtResource.dll	Pass	Pass	Pass
emtInterface.dll	Pass	Pass	Pass
Interop.DATAEXTRACTORLib.dll	Pass	Pass	Pass
Interop.IRsolution.dll	Pass	Pass	Pass
MacroItemInfo.xml	Pass	Pass	Pass
MacroItemInfo.xsd	Pass	Pass	Pass
Arithmetic.bas	Pass	Pass	Pass
ATRCorrection.bas	Pass	Pass	Pass
AutoZero.bas	Pass	Pass	Pass
Baseline3Point.bas	Pass	Pass	Pass
BeginFrame.bas	Pass	Pass	Pass
BKGScan.bas	Pass	Pass	Pass
CloseContainer.bas	Pass	Pass	Pass
CloseContainer_bak.bas	Pass	Pass	Pass

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===== Shimadzu LabSolutions Check the Program Files Report =====

Connect.bas	Pass	Pass	Pass
Cut.bas	Pass	Pass	Pass
Derivative.bas	Pass	Pass	Pass
ExcuteBasic.bas	Pass	Pass	Pass
ExportContainer.bas	Pass	Pass	Pass
FrequencyConvert.bas	Pass	Pass	Pass
FrequencyConvert2.bas	Pass	Pass	Pass
FTIRInitialize.bas	Pass	Pass	Pass
KramersKronig.bas	Pass	Pass	Pass
Kubelka.bas	Pass	Pass	Pass
LaplaceInterpol.bas	Pass	Pass	Pass
MaxNormalize.bas	Pass	Pass	Pass
Mesure.bas	Pass	Pass	Pass
Normalize.bas	Pass	Pass	Pass
OpenContainer.bas	Pass	Pass	Pass
PeakPick.bas	Pass	Pass	Pass
PrintWithTemplate.bas	Pass	Pass	Pass
Purity.bas	Pass	Pass	Pass
QuantAnalyze.bas	Pass	Pass	Pass
Reduce.bas	Pass	Pass	Pass
SampleScan.bas	Pass	Pass	Pass
Save.bas	Pass	Pass	Pass
SaveAs.bas	Pass	Pass	Pass
SetParameterDetail.bas	Pass	Pass	Pass
SetParameterFile.bas	Pass	Pass	Pass
SetParameterMain.bas	Pass	Pass	Pass
Smooting.bas	Pass	Pass	Pass
SpectrumSearch.bas	Pass	Pass	Pass
PointPick.bas	Pass	Pass	Pass
Dataset.bas	Pass	Pass	Pass
AtmosphereCorrection.bas	Pass	Pass	Pass
AdvancedATRCorrection.bas	Pass	Pass	Pass
ValidationXML.bas	Pass	Pass	Pass

Total: Pass

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========== Shimadzu LabSolutions PC Information Report ==========

Computer Name: DESKTOP-5ULUA14
PC Type: Stand-alone PC

<<OS Information>>
Name: Microsoft Windows 11 Pro (64-bit)
Service Pack: -
Security Patch Information: Update (KB5056579)
Update (KB5064081)
Update (KB5064531)

<<PC Specification>>
CPU Model: Intel(R) Core(TM) Ultra 5 235（14）
Physical Memory Size: 15826.75 MByte
Drive Name: C File System: NTFS Used/Capacity: 43.61/476.22 GByte
Drive Name: D File System: NTFS Used/Capacity: 1.61/476.82 GByte

<<Network>>
Domain/Workgroup Name: WORKGROUP
IP Address: fe80::98de:404:ebb8:3e84%6; 169.254.164.17
Subnet: 255.255.0.0
MAC Address: E8-CF-83-4E-AA-A1
Default Gateway:
DNS Server Address: 8.8.8.8
Use of DHCP: Enabled

<<Account Policy>>
Minimum Password Length: 0char
Minimum Password Age: 0days
Maximum Password Age: 42days
Enforce Password History: 0Passwords remembered
Password must meet complexity requirements: Disabled
Account Lockout Threshold: 10invalid logon attempts
Reset account lockout counter after: 10min
Account Lockout Duration: 10min
Store passwords using reversible encryption: Disabled

<<Audit Policy>>
Audit account management: No Auditing
Audit object access: No Auditing
Audit system events: No Auditing
Audit directory service access: No Auditing
Audit process tracking: No Auditing
Audit policy change: No Auditing
Audit logon events: No Auditing
Audit privilege use: No Auditing
Audit account logon events: No Auditing

<<User or Group with Permission of Changing the System Time>>
Name: Administrators
LOCAL SERVICE

<<Security Options>>
Interactive Logon: Do not require CTRL+ALT+DEL: Not Defined
Interactive Logon: Do not display last user name: Disabled

<<Others>>
Time Zone: SE Asia Standard Time

<<Software Version>>
LabSolutions IR: 2.34
LabSolutions Manager: 1.122

เพิ่มเติม

Printed by: System Administrator 28/11/2568 11:10:41

========== Shimadzu LabSolutions PC Information Report ==========

<<Printer Information (Driver Information)>>
Microsoft Print to PDF (Microsoft Print To PDF)

เฉลิมชาติ

Test: measure S/N(/KRS-5 window

No.	S/N
1	88396.0
2	67663.7
3	91659.0
4	65159.5
5	67489.3
6	106821.1
7	65005.1
8	78736.8
9	67992.8
10	65692.2
Ave.	76461.6

Criteria: more than 42000:1

Determination OK

เฉลิมชาติ

Certified Reference Materials for UV, Visible, NIR and IR Molecular Spectroscopy

RM-1921/38

Set Serial 40776

Customer Details:

Bara Scientific Co. Ltd
U Chu Liang Building Floor 7
968 Rama 4 Road
Silom, Bangrak
Bangkok 10500
Thailand

The customer information stated on this page number 1, applies to all certificates.

Original Starna references are manufactured under ISO 17034:2016 accreditation

All calibration measurements are performed under ISO/IEC 17025:2017 accreditation.

UKAS REFERENCE MATERIALS 4001

Reference Material Certificate of Calibration and Traceability

Polystyrene film (38 micron thick) mounted in a card holder for use as a wavenumber accuracy reference in the IR spectrum

Calibration Lab.
Starna Scientific Ltd
52/54 Fowler Rd
HAINAULT
Essex IG6 3UT
England
Tel. +44 (0) 20 8501 5550

Email: sales@starna.com

Reference Serial Number: 123840
Certificate Number: 111394
Certificate Date: 10/05/2023
Expiration Date: 10/05/2026
Set Serial Number: 40776
Analysis Number: IR111394123840

UKAS CALIBRATION 0659

Description of Reference Material:

This reference material consists of a flat polystyrene film which is mounted in a card holder to give a 25 mm circular measurement aperture.The reference material is designed for the verification and calibration of the wavenumber scales of FTIR spectrophotometers, and to meet the requirements of all major Pharmacopoeia (EP/JP/USP) for wavenumber and resolution control.

Certified Values of Reference Material:

The film is measured in the transmittance mode against an air blank, over the wavenumber range of 4000 to 400 cm-1. For each resolution, a baseline correction is performed with an empty cell holder. The fourteen primary transmittance minima are identified and certified to be within the expected wavenumber range tolerance for each resolution setting, as specified by the NIST reference control.

The combined analytical and instrument uncertainties at the 95 % confidence level (k=2) are shown below.

Wavenumber (cm-1)*	Expanded Uncertainty (U)
539.41	1.42
841.79	0.72
906.63	0.22
1028.27	0.18
1069.22	0.52
1154.50	0.12
1582.98	0.08
1601.29	0.12
1942.97	0.66
2849.48	0.30
3001.20	0.13
3025.99	0.32
3060.16	0.17
3082.26	0.14

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

The uncertainty evaluation has been carried out in accordance with UKAS requirements.

***NB: These wavenumber (cm-1) values are the internal certified reference values from NIST primary SRM 1921b - serial # 0213-3**

Resolution (cm-1)	Wavenumbers in cm-1 of peak minima as referenced to vacuum for Starna CRM serial # 123840
4.00	539.44
	841.71
	906.62
	1028.16
	1069.20
	1154.47
	1582.97
	1601.28
	1943.24
	2849.46
	3001.16
	3025.85
	3060.19
	3082.21

European Pharmacopoeia compliance
The difference between the absorption minima at 2870 cm-1 and the maxima at 2849.5 cm-1 is greater than 0.33 and the difference between the absorption minima at 1589 cm-1 and the maxima at 1583 cm-1 is greater than 0.08.

Japanese Pharmacopoeia compliance
The depth of the trough from the maximum absorption at about 2850 cm-1 to the minimum at about 2870 cm-1 is not less than 18% transmittance and that from the maximum at about 1583 cm-1 to the minimum at about 1589 cm-1 is not less than 12% transmittance.

US Pharmacopeia compliance
A wavenumber tolerance of +/- 1.0 cm-1 is allowed on the position of the following bands; 3060.0, 2849.5, 1942.9, 1601.2, 1583.0, 1154.5 and 1028.3 cm-1.

TGA Australia compliance
TGA allows the use of either BP/EP or USP as appropriate.

This certificate is issued in accordance with the laboratory accreditation requirements of the United Kingdom Accreditation Service. It provides traceability of measurement to the SI system of units and/or to units of measurement realised at the National Physical Laboratory or other recognised national metrology institutes. This certificate may not be reproduced other than in full, except with the prior written approval of the issuing laboratory.

เพิ่มชาติ
สำเนาเอกสาร ง-2 หน้า 73/139
เพิ่มชาติ

Certifying Instrument Qualification:

All calibration is performed on an Avatar 380 reference spectrophotometer. The instrument is tested and confirmed toperform to the manufacturers written specification over the analytical range used for the reference material certification.

The following references and procedures are used in the quality performance procedures relating to the qualification of the spectrophotometer performance:

Wavenumber: NIST SRM 1921b, Polystyrene (Serial # 0213-3)

Calibration Method:

The conditions of analysis used to generate the certified values on this certificate are as listed in the chart below:

No. Of scans:	10 x 32
Resolution:	4 cm-1
Detector:	DTGS KBr
Beamsplitter:	KBr
Range:	4000 - 400 cm-1
Apodization:	Happ-Genzel
Phase Correction:	Mertz
Temperature:	23 +/- 1 ºC

Instructions for Use:

Using the above instrument settings, collect a background on air. Insert the sample in the film holder and repeat.

Repeat the measurement process at least six times.

Identify the reported transmittance minima and compare these to the certified minima shown.

If you find any significant differences, it is recommended that an approved manufacturer's representative inspects the instrument to determine the source of the difference.

Instrument Dependencies:

The instrument to be tested should have a resolution of 4 cm-1 or better. Consult the instrument owners handbook for this information.

Duration of Certificate:

This certification is valid for a maximum period of three years from the date of issue or sooner if specified by the user's own protocols.

Re-certification Procedure:

All reference materials are originally certified and supplied in a useable condition. There is no warranty for fitness beyond initial receipt by the customer.

When references need to be re-certified or inspected for any reason, customers should return them to the Starna ISO/IEC 17025 & 17034 accredited calibration laboratory, where all previous data are collated.

On receipt by Starna Scientific the references are measured "As Received" before cleaning under the re-certification procedure. "As received" data are available on request.

Storage and Care:

Reference (s) should always be stored in the box provided in a low-humidity environment e.g. FTIR sample compartment, desiccator, or similar 'dry' environment and handled with care. References are fragile and should be inserted and removed from the instrument taking care not to twist or apply leverage against the film holder.

Damage in the form of scratches or contamination may alter the certified values significantly such that they need re-certifying or even complete replacement.

Calibration performed by:

Calibration Technician - P. Wakelin RSci AMRSC

Approved Signatory:

Calibration Manager - A. Wakelin CSci CChem MRSC

This certificate is issued in accordance with the laboratory accreditation requirements of the United Kingdom Accreditation Service. It provides traceability of measurement to the SI system of units and/or to units of measurement realised at the National Physical Laboratory or other recognised national metrology institutes. This certificate may not be reproduced other than in full,

Calibration Lab.
Starna Scientific Ltd
52/54 Fowler Rd
HAINAULT
Essex IG6 3UT
England
Tel. +44 (0) 20 8501 5550

Email: sales@starna.com

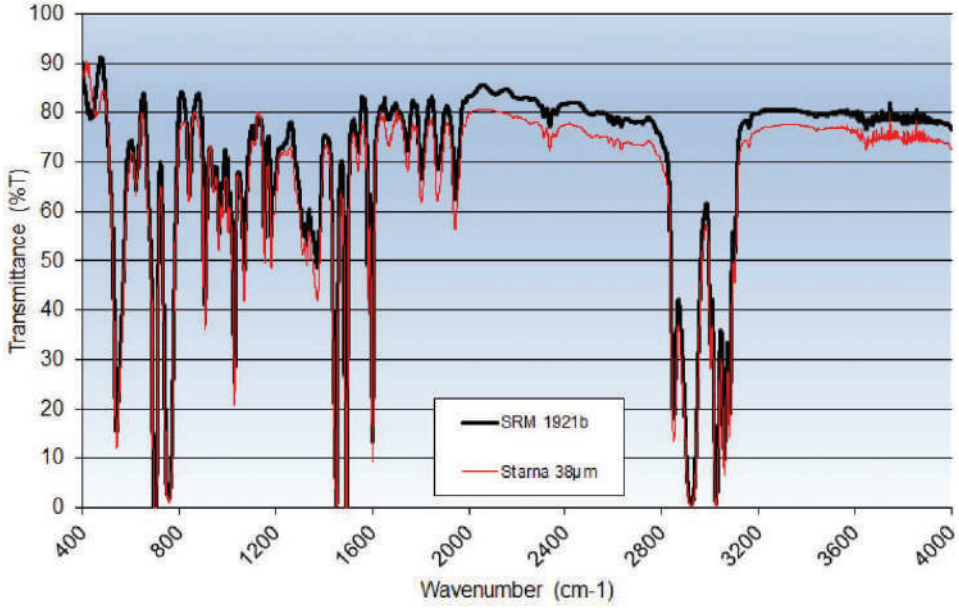
Reference Material Certificate of Calibration and Traceability

Polystyrene film (38 micron thick) mounted in a card holder for use as a wavenumber accuracy reference in the IR spectrum

Reference Serial Number: 123840
Certificate Number: 111394
Certificate Date: 10/05/2023
Expiration Date: 10/05/2026
Set Serial Number: 40776
Analysis Number: IR111394123840

UKAS CALIBRATION
0659

Appendix A: Spectral Characteristics



This certificate is issued in accordance with the laboratory accreditation requirements of the United Kingdom Accreditation Service. It provides traceability of measurement to the SI system of units and/or to units of measurement realised at the National Physical Laboratory or other recognised national metrology institutes. This certificate may not be reproduced other than in full, except with the prior written approval of the issuing laboratory.

เพิ่มเติม
ภาคผนวก ง-2 หน้า 74/139

Bara Scientific
Solution of Success

Certificate of Attendance

This certificate is hereby awarded to

Mr. Chalermchat Kongthai

Bara Scientific Co., Ltd.

for having attended the

FTIR with Labsolutions IR Basic Service Training

conducted from 1st November to 24th November In the year 2023

held by BARA SCIENTIFIC CO., LTD.

given this day of 24th November 2023

Trained By :

NutB.

Mr. Nut Bumrungwipusana

Senior Service Engineer, AA Group

SHIMADZU

Bara Scientific Co., Ltd.

Mr. Phoosak Hirunyatrakul

Managing Director

CA-ANALYTICAL-202311011124-0101

FM-SS-19 REV.00:03/03/2010

CERTIFICATE OF ATTENDANCE BARA SCIENTIFIC

P.39

SITHIPORN ASSOCIATES CO., LTD.
CALIBRATION LABORATORY
45/1-45/1 sirinthorn Road, Bangbumru, Bangplud, Bangkok, 10700 Thailand
Tel. +66 2433 8331 Email : calibration@sithiporn.com

SITHIPORN associates

ilac-MRA

NSC-TISI-TIS 17025 CALIBRATION 0594

Calibration Certificate

Cert. No. : SP25026
Pages : 1 of 4

Equipment :	UV-VIS SPECTROPHOTOMETER
Manufacturer :	PERKINELMER
Model :	LAMBDA 25
Serial No.:	501S14123010
ID No.:	SP03/58
Calibration Mode :	WAVELENGTH ACCURACY PHOTOMETRIC ACCURACY STRAY LIGHT
Condition As Found :	GOOD
Customer :	S.P.S CONSULTING SERVICE CO., LTD. 7 SOI PHAHOLYOTHIN 24, PHAHOLYOTHIN ROAD, CHOMPHON SUB-DISTRICT, CHATUCHAK DISTRICT, BANGKOK PROVINCE 10900 THAILAND.
Location :	ORGANIC LABORATORY IV
Ambient Temperature :	(22.9 ± 5) °C
Relative Humidity :	(53.7 ± 25) %
Received Date :	22 AUGUST 2025
Calibration Date :	22 AUGUST 2025
Date of Issue :	25 AUGUST 2025

Calibrated by : Nitinun Srihawan

Approved by : Wichok E.

(Wichok Ekpongpradit)

This certificate is issued in accordance with the requirements of ISO/IEC 17025 standard, may not be reproduced other than in full, except with the prior written approval of the head of Calibration Laboratory.

หน้า 75/139

Cert. No. : SP25026
Job No. : VC68SP0019
Pages : 2 of 4

Calibration Method :

This instrument was calibrated by using on-site calibration procedure In-house method : CP-SP-01
The calibration procedure to direct measurement wavelength accuracy by using wavelength standard solution, Photometric accuracy by using absorbance standard filter and absorbance standard solution
The calibration procedure used was based on ASTM E275-01,ASTM E925-02

Condition of this result of calibration :

1. Certified reference materials

Material	Ref. type	Cell serial No.	Cert. No.	Due Date
Holmium liquid	RM-HL	29706	126461	24/10/2026
Didymium liquid	RM-DL	28912	126462	24/10/2026
Neutral density filter	RM-1N2N3N	13877	126457	24/10/2026
Potassium dichromate solutions	RM-0204060810	14204	126497	25/10/2026
Potassium Iodide solution	-	KI-0701-001	CI-0185-24	14/05/2026

2. This result of calibration was found accurate as shown on date and place of calibration only.
3. This certificate is traceable to the international system of unit maintained at :
   3.1 The UK National Physical Laboratory (NPL)

Result of calibration : Wavelength Accuracy

(Without adjustment)

Material	Certified Values of Reference Material (nm)	UUC* Reading (nm)	Error (nm)	Uncertainty ± (nm)	k Factor
RM-HL	278.13	278.21	0.08	0.16	2.00
	361.25	361.39	0.14	0.16	2.00
	467.82	467.71	-0.11	0.16	2.00
	536.56	536.50	-0.06	0.16	2.00
	640.50	640.36	-0.14	0.16	2.00
RM-DL	740.09	739.85	-0.24	0.16	2.00
	864.94	865.12	0.18	0.16	2.00

UUC* = Unit Under Calibration

Cert. No. : SP25026
Job No. : VC68SP0019
Pages : 3 of 4

Result of calibration : Photometric Accuracy

Material	Wavelength (nm)	Filter S/N	Nominal Absorbance (A)	Certified Absorbance (A)	UUC* Reading Absorbance (A)	Error (A)	Uncertainty ± (A)	k Factor
Neutral Density glass filter	440.0	29381	0.5	0.5443	0.5413	-0.0030	0.0043	2.00
		29914	0.7	0.7484	0.7455	-0.0029	0.0054	2.00
		29360	1.0	1.0527	1.0535	0.0008	0.0032	2.00
	465.0	29381	0.5	0.4948	0.4922	-0.0026	0.0041	2.00
		29914	0.7	0.6906	0.6877	-0.0029	0.0050	2.00
		29360	1.0	0.9695	0.9709	0.0014	0.0031	2.00
	546.1	29381	0.5	0.5090	0.5068	-0.0022	0.0036	2.00
		29914	0.7	0.6985	0.6960	-0.0025	0.0041	2.00
		29360	1.0	0.9814	0.9825	0.0011	0.0031	2.00
	590.0	29381	0.5	0.5375	0.5353	-0.0022	0.0034	2.00
		29914	0.7	0.7256	0.7231	-0.0025	0.0037	2.00
		29360	1.0	1.0213	1.0219	0.0006	0.0032	2.00
	635.0	29381	0.5	0.5223	0.5202	-0.0021	0.0033	2.00
		29914	0.7	0.6927	0.6901	-0.0026	0.0036	2.00
		29360	1.0	0.9744	0.9750	0.0006	0.0032	2.00

UUC* = Unit Under Calibration

SITHIPORN associates

SITHIPORN ASSOCIATES
CALIBRATION LABORATORY

Cert. No. : SP25026
Job No. : VC68SP0019
Pages : 4 of 4

Result of calibration : Photometric Accuracy

(Without adjustment)

Material	Wavelength (nm)	Solution (mg/l)	Certified Absorbance (A)	UUC* Reading Absorbance (A)	Error (A)	Uncertainty ± (A)	*k* Factor
Potassium dichromate solutions	235.0	20	0.2415	0.2443	0.0028	0.0101	2.00
		40	0.4866	0.4871	0.0005	0.0115	2.00
		60	0.7415	0.7295	-0.0120	0.0067	2.00
		80	0.9854	0.9844	-0.0010	0.0071	2.00
		100	1.2444	1.2425	-0.0019	0.0073	2.00

UUC* = Unit Under Calibration

Condition of this result of calibration : Spectrophotometer PERKINELMER Model LAMBDA 25 S/N 501S14123010

Resolution of Wavelength Mode	0.1 nm
Resolution of Photometric Mode	0.001 A
Parameter Setting	
Measurement Mode	Wavelength, Absorbance
Wavelength Scan	190 nm - 1100 nm
Scanning Speed	7.5 nm/min
Band width(Wavelength)	1.0
Band width(Vis)	1.0
Band width(Uv)	1.0

Stray Light** UUC* Reading at 220.0 nm	
Transimission T(%)	Absorbance(A)
0.020	3.7032

**Specific Acceptance :
Transmission ≤ 1.0 T(%), Absorbance ≥ 2.0 A
**Stray light not TISI Accredited

The reported uncertainty is based on a standard uncertainty mutiplied by a coverage factor *k*, providing a level of confidence of approximately 95%

End of Calibration Certificate

ARCHEMICA

Certificate of Calibration

Aquion : Anion (ID#894)

This certificate is to verify that instrument below are calibrated

by Archemica Lab Co.,Ltd.

AQUION S/N : 190840059

AS-DV S/N : 190915235

for

S.P.S. Consulting Service Co., Ltd.

ARCHEMICA LAB
บริษัท อาร์เคมีก้า แลบ จำกัด
ARCHEMICA LAB CO.,LTD.

Operator Signature : Teerapat B Date : Jun 6, 2025

(Mr. Teerapat Boonla)

Application Chemist

Certificate of System Qualification

GC-OQ + GCMS-OQ

System ID:	GC/MS 05/62
Organization Name:	S.P.S.Consulting Service Co.,Ltd.
Organization Location:	7 Soi Paholyothin 24 Bangok 10900
Date:	December 4, 2025 1:51:07 PM
EQP Name:	AgilentRecommended , AgilentRecommended
EQP Revision:	GC.02.50, GCMS.02.50
Overall Qualification Status:	Pass

System Inspection and Basic Safety and Operation

Name:	8890
Setpoint Status:	**Pass**

Overall System Inspection and Basic Safety and Operation Test Status

Pass

Inlet Pressure Decay

Name:	8890				
	Back	SSL			
Setpoint Status:	**Pass**				
Pressure:	25.0	psi			
Pressure Change:		-0.2	psi	/5 minutes	
Agilent Recommended:	>=	-2.0	and	<=	0.5

Overall Inlet Pressure Decay Test Status

Pass

Inlet Pressure Accuracy

Name:	8890			
	Back	SSL		
Setpoint Status:	**Pass**			
	Setpoint		Actual	
Inlet Pressure:	25.0	psi	25.0	psi
Accuracy:			0.0	psi
Agilent Recommended:			<= 1.2	

Overall Inlet Pressure Accuracy Test Status

Pass

Inlet Pressure Decay

Name:	8890				
	Front	SSL			
Setpoint Status:	**Pass**				
Pressure:	25.0	psi			
Pressure Change:		-0.1	psi	/5 minutes	
Agilent Recommended:	>=	-2.0	and	<=	0.5

Overall Inlet Pressure Decay Test Status

Pass

Inlet Pressure Accuracy

Name:	8890				
	Front	SSL			
Setpoint Status:	**Pass**				
	Setpoint		Actual		
Inlet Pressure:	25.0	psi	25.0	psi	
Accuracy:			0.0	psi	
Agilent Recommended:			<= 1.2		

Overall Inlet Pressure Accuracy Test Status

Pass

Detector Flow Accuracy

Name: 8890
Back FPD+

Setpoint Status: **Pass**

Flow Type: Fuel
Setpoint: 60.0 mL/min Measured Flow: 59.6 mL/min

Accuracy: 0.4 mL/min
Agilent Recommended: <= 10.0 % setpoint (6.0 ml/min)
Limit is percentage of setpoint or 0.5 ml/minute, whichever is largest.

Setpoint Status: **Pass**

Flow Type: Oxidizer
Setpoint: 60.0 mL/min Measured Flow: 59.7 mL/min

Accuracy: 0.3 mL/min
Agilent Recommended: <= 10.0 % setpoint (6.0 ml/min)
Limit is percentage of setpoint or 0.5 ml/minute, whichever is largest.

Setpoint Status: **Pass**

Flow Type: Makeup
Setpoint: 60.0 mL/min Measured Flow: 75 mL/min
Purge Offset: 20 % setpoint
Adjusted Setpoint: 72.00 mL/min

Accuracy: 3.0 mL/min
Agilent Recommended: <= 10.0 % setpoint (7.2 ml/min)
Limit is percentage of setpoint or 0.5 ml/minute, whichever is largest.

Overall Detector Flow Accuracy Test Status

Pass

Detector Flow Accuracy

Name: 8890
Front FID

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Setpoint Status: **Pass**

Flow Type: Fuel
Setpoint: 30.0 mL/min Measured Flow: 30.2 mL/min

Accuracy: 0.2 mL/min
Agilent Recommended: <= 10.0 % setpoint (3.0 ml/min)
Limit is percentage of setpoint or 0.5 ml/minute, whichever is largest.

Setpoint Status: **Pass**

Flow Type: Oxidizer
Setpoint: 400.0 mL/min Measured Flow: 396 mL/min

Accuracy: 4.0 mL/min
Agilent Recommended: <= 10.0 % setpoint (40.0 ml/min)
Limit is percentage of setpoint or 0.5 ml/minute, whichever is largest.

Setpoint Status: **Pass**

Flow Type: Makeup
Setpoint: 25.0 mL/min Measured Flow: 25.3 mL/min

Accuracy: 0.3 mL/min
Agilent Recommended: <= 10.0 % setpoint (2.5 ml/min)
Limit is percentage of setpoint or 0.5 ml/minute, whichever is largest.

Overall Detector Flow Accuracy Test Status

Pass

GC Oven Temperature Accuracy

Name: 8890

Setpoint Status:	**Pass**			
Zone:	Oven			
	Setpoint/Actual			
Temperature:	230.0	229.7	°C	
Accuracy:		-0.3	°C	
Agilent Recommended:	>=	-1.0	% setpoint in K	(-5.0 °C)
	<=	1.0	% setpoint in K	(5.0 °C)

Setpoint Status:	**Pass**			
Zone:	Oven			
	Setpoint/Actual			
Temperature:	100.0	99.8	°C	
Accuracy:		-0.2	°C	
Agilent Recommended:	>=	-1.0	% setpoint in K	(-3.7 °C)
	<=	1.0	% setpoint in K	(3.7 °C)

Overall GC Oven Temperature Accuracy Test Status

Pass

GC Oven Temperature Stability

Name:	8890			
Setpoint Status:	**Pass**			
	Setpoint/Average			
Temperature:	100.0	99.76667	°C	
Stability:		0.1	°C	
Agilent Recommended:	<=	0.5		

Overall GC Oven Temperature Stability Test Status

Pass

Scouting Run

Tested Combination1	Back	SSL	/ Back	FPD+
	Manual Injection			
Name:	Not applicable			

Setpoint Status:	**Completed**
Injection Volume on Column:	1.0 uL
Mode:	S-Mode

Overall Scouting Run Status

Completed

Noise and Drift

Tested Combination1	Back	SSL	/ Back	FPD+
Name:	8890			

Setpoint Status:	**Pass**			
Mode:	S-Mode			
Base Signal:	65	150 pA		

		ASTM Noise Response		Drift Response/h
		20700.29		1944.69
Agilent Recommended:	<=	30720.00	<=	23040.00
Status:		Pass		Pass

Overall Noise and Drift Test Status

Pass

Signal to Noise

Tested Combination1	Back	SSL	/ Back	FPD+
	Manual Injection			
Name:	8890			

Mode:	S-Mode	
Setpoint Status:	**Pass**	
Signal to Noise:		341448
Agilent Recommended:	>=	1400

Overall Signal to Noise Test Status

Pass

Scouting Run

Tested Combination2	Front Injection Tower	SSL	/ Front	FID
Name:	7693A			

Setpoint Status: **Completed**

Injection Volume on Column: 1.0 uL

Overall Scouting Run Status

Completed

Noise and Drift

Tested Combination2	Front	SSL	/ Front	FID
Name:	8890			

Setpoint Status: **Pass**

Base Signal: 11.5 pA

	ASTM Noise Response		Drift Response/h	
	284.49		2764.01	
Agilent Recommended:	<=	768.00	<=	19200.00
Status:	Pass		Pass	

Overall Noise and Drift Test Status

Pass

Injection Precision

Tested Combination2	Front	SSL	/ Front	FID
Name:	7693A			

Setpoint Status: **Pass**

Injection Volume on Column: 1.0 uL

Area RSD:		0.53 %	Retention Time RSD:	0.03 %
Agilent Recommended:	<=	3.00	<=	1.00

Overall Injection Precision Test Status

Pass

Signal to Noise

Tested Combination2	Front Injection Tower	SSL	/ Front	FID
Name:	8890			

Setpoint Status: **Pass**

Signal to Noise:		1101022
Agilent Recommended:	>=	300000

Overall Signal to Noise Test Status

Pass

Log Amp

Tested Combination3	Front	SSL	/ External	SQ
Name:	5977B			

Setpoint Status: **Pass**

Overall Log Amp Test Status

Pass

RFPA

Tested Combination3	Front	SSL	/ External	SQ
Name:	5977B			

Setpoint Status: Pass

Amu: 1050 m/z

	Drift After Five Minutes:				RFPA Voltage:	
	-9 mV				534	mV
Agilent Recommended:	>= -100	and	<= 100		<= 1100	

Overall RFPA Test Status

Pass

Tune EI

Tested Combination3 Front SSL / External SQ

Name: 5977B

Setpoint Status: Pass

Filament: 1

Setpoint Status: Pass

Filament: 2

Overall Tune EI Test Status

Pass

Scouting Run

Tested Combination3 Front SSL / External SQ
Injection Tower

Name: 7693A

Source: EI - Inert

Setpoint Status: Completed

Injection Volume on Column: 1.0 uL

Overall Scouting Run Status

Completed

Instrument Detection Limit

Tested Combination3 Front SSL / External SQ
Injection Tower

Name: 7693A

Source: EI - Inert

Setpoint Status: Pass

Injection Volume on Column: 1.0 uL

	Area		Retention Time	
Minimum RSD:	3.54	%	0.02	%
Agilent Recommended:	<= 5.00		<= 1.00	
Status:	Pass		Pass	

Instrument Detection Limit: 1.18983 fg

Agilent Recommended: <= 1.68250

Status: Pass

Overall Instrument Detection Limit Test Status

Pass

Mass Ratio Precision

Tested Combination3 Front SSL / External SQ
Injection Tower

Name: 7693A

Source: EI - Inert

Setpoint Status: Pass

Injection Volume on Column: 1.0 uL

	Area Mass 1 Abundance*s		Mass Ratio	
RSD:	0.34	%	0.16	%
Agilent Recommended:	<= 5.00		<= 5.00	
	Pass		Pass	

Overall Mass Ratio Precision Test Status

Pass

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Instrument Details

Purpose

This section describes the as found system configuration.

Details

System	
System ID	GC/MS 05/62
Manufacturer	Agilent Technologies
Name	8890
Tested Combination1	
Injection Technique	Manual Injection
Inlet	Back
Detector	Back
LTM Included?	No
Tested Combination2	
Injection Technique	Injection Tower
Inlet	Front
Detector	Front
LTM Included?	No
Tested Combination3	
Injection Technique	Injection Tower
Inlet	Front
Detector	External
LTM Included?	No
Sampler 1	
Manufacturer	Agilent Technologies
Type	Manual Injection
Usage	Sample Injection
Syringe Volume (µL)	10

Sampler 2

Manufacturer	Agilent Technologies
Type	Injection Tower
Name	7693A
Model Number	G4513A
Serial Number	CN19360205
Firmware Revision	A.11.03
Usage	Sample Injection
Location	Front
Syringe Volume (µL)	10

Sampler 3

Manufacturer	Agilent Technologies
Type	Tray
Name	7693A
Model Number	G4514A
Serial Number	CN19430060
Firmware Revision	A.11.03
Vial Heater	Not installed

Mainframe 1

Manufacturer	Agilent Technologies
Name	8890
Model Number	G3542A
Serial Number	CN1944A148
Firmware Revision	2.3.3.6
Oven Type	Standard

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Inlet 1

Manufacturer	Agilent Technologies
Name	8890
Type	SSL
Location	Front
Carrier Gas	Helium
Control Type	Electronic Pressure Control (EPC)
Purged Inlet	Yes

Inlet 2

Manufacturer	Agilent Technologies
Name	8890
Type	SSL
Location	Back
Carrier Gas	Helium
Control Type	Electronic Pressure Control (EPC)
Purged Inlet	Yes

Detector 1

Manufacturer	Agilent Technologies
Name	8890
Type	FID
Adapter	Capillary
Control Type	Electronic Pressure Control (EPC)
Location	Front
Makeup Gas	Nitrogen

Detector 2

Manufacturer	Agilent Technologies
Name	8890
Type	FPD+
Adapter	Capillary
Control Type	Electronic Pressure Control (EPC)
Location	Back
Makeup Gas	Nitrogen
First Filter Tested	S-Mode

Detector 3

Manufacturer	Agilent Technologies
Name	Mass Spectrometer
Type	Mass Spectrometer
Location	External

Mass Spectrometer 1

Manufacturer	Agilent Technologies
Type	SQ
Name	5977B
Serial Number	US1947M001
Firmware Revision	6.00.04
High Vacuum System	Turbo Pump
Scouting Run Standard	MRP Std

MS EI Source 1

Manufacturer	Agilent Technologies
Source Type	EI - Inert
Number of filaments	2

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Electronic Signature

Purpose

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Full Name of Signer:	Adirek Rattanawijit
Logged On User Name:	adirek.rattanawijit@non.agilent.com
Signature Creation Date:	December 4, 2025
Reason for Signature:	Executed protocol and published this original version of document

ACE Self Qualification Status

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User Name: adirek.rattanawijit
System Id: GC/MS 05/62
Report Generated by Hostname: C614-QA
Print Date: December 4, 2025 1:51:09 PM

SPS_OQGCMS_5977B_2025 Transaction log :

Time	Transaction State	Activity Performed	Type of Transaction	Optional Information
December 4, 2025 11:27:05 AM	Audit	SessionCreated	Session	Host Name: C614-QA, Drive Serial Number: 42776F5E
December 4, 2025 11:27:05 AM	start	Configuration	Session	None
December 4, 2025 11:27:05 AM	Audit	Entitlement	Licensing	User is Nonpaying and does not require an unlock code
December 4, 2025 11:39:42 AM	Audit	EqpLoaded	Session	EQP details for primary technique [Gc] - File path: [ProtocolPacks/Gc/Configurations/02.50/Gc.02.50.eqp], EQP File Name: [Gc.02.50.eqp], EQP Name: [AgilentRecommended],Protocol Revision :[Gc.02.50] EQP details for hyphenated technique [GcMs] - File path: [ProtocolPacks/GcMs/Configurations/02.50/GcMs.02.50.eqp], EQP File Name: [GcMs.02.50.eqp], EQP Name: [AgilentRecommended]
December 4, 2025 11:39:46 AM	End	Configuration	Session	None
December 4, 2025 11:39:58 AM	start	Qualification	Session	OQ
December 4, 2025 11:39:58 AM	start	Execution	System Inspection and Basic Safety and Operation - 8890: - Qualitative Test - No setpoints associated	None

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SPS_OQGCMS_5977B_2025 Transaction log :

Time	Transaction State	Activity Performed	Type of Transaction	Optional Information
December 4, 2025 11:40:47 AM	End	Execution	System Inspection and Basic Safety and Operation - 8890: - Qualitative Test - No setpoints associated	Run Count : 1
December 4, 2025 11:40:49 AM	start	Execution	Inlet Pressure Decay - Back SSL: - Pressure Controlled Inlet - S: 25.0 psi - L: >= -2.0 psi and <= 0.5 psi	None
December 4, 2025 11:41:04 AM	End	Execution	Inlet Pressure Decay - Back SSL: - Pressure Controlled Inlet - S: 25.0 psi - L: >= -2.0 psi and <= 0.5 psi	Run Count : 1
December 4, 2025 11:41:07 AM	start	Execution	Inlet Pressure Accuracy - Back SSL: - Pressure Controlled Inlet - S: 25.0 psi - L: <= 1.2 psi	None
December 4, 2025 11:41:20 AM	End	Execution	Inlet Pressure Accuracy - Back SSL: - Pressure Controlled Inlet - S: 25.0 psi - L: <= 1.2 psi	Run Count : 1
December 4, 2025 11:41:24 AM	start	Execution	Inlet Pressure Decay - Front SSL: - Pressure Controlled Inlet - S: 25.0 psi - L: >= -2.0 psi and <= 0.5 psi	None
December 4, 2025 11:41:36 AM	End	Execution	Inlet Pressure Decay - Front SSL: - Pressure Controlled Inlet - S: 25.0 psi - L: >= -2.0 psi and <= 0.5 psi	Run Count : 1
December 4, 2025 11:41:38 AM	start	Execution	Inlet Pressure Accuracy - Front SSL: - Pressure Controlled Inlet - S: 25.0 psi - L: <= 1.2 psi	None
December 4, 2025 11:41:42 AM	End	Execution	Inlet Pressure Accuracy - Front SSL: - Pressure Controlled Inlet - S: 25.0 psi - L: <= 1.2 psi	Run Count : 1

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SPS_OQGCMS_5977B_2025 Transaction log :

Time	Transaction State	Activity Performed	Type of Transaction	Optional Information
December 4, 2025 11:41:45 AM	start	Execution	Detector Flow Accuracy - Back FPD+: - Type : Fuel - S: 60.0 mL/min - L: <= 10.0% setpoint	None
December 4, 2025 11:42:04 AM	End	Execution	Detector Flow Accuracy - Back FPD+: - Type : Fuel - S: 60.0 mL/min - L: <= 10.0% setpoint	Run Count : 1
December 4, 2025 11:42:07 AM	start	Execution	Detector Flow Accuracy - Back FPD+: - Type : Oxidizer - S: 60.0 mL/min - L: <= 10.0% setpoint	None
December 4, 2025 11:42:14 AM	End	Execution	Detector Flow Accuracy - Back FPD+: - Type : Oxidizer - S: 60.0 mL/min - L: <= 10.0% setpoint	Run Count : 1
December 4, 2025 11:42:34 AM	start	Execution	Detector Flow Accuracy - Back FPD+: - Type : Makeup - S: 60.0 mL/min - L: <= 10.0% setpoint	None
December 4, 2025 11:42:40 AM	End	Execution	Detector Flow Accuracy - Back FPD+: - Type : Makeup - S: 60.0 mL/min - L: <= 10.0% setpoint	Run Count : 1
December 4, 2025 11:42:44 AM	start	Execution	Detector Flow Accuracy - Front FID: - Type : Fuel - S: 30.0 mL/min - L: <= 10.0% setpoint	None
December 4, 2025 11:42:59 AM	End	Execution	Detector Flow Accuracy - Front FID: - Type : Fuel - S: 30.0 mL/min - L: <= 10.0% setpoint	Run Count : 1
December 4, 2025 11:43:06 AM	start	Execution	Detector Flow Accuracy - Front FID: - Type : Oxidizer - S: 400.0 mL/min - L: <= 10.0% setpoint	None

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SPS_OQGCMS_5977B_2025 Transaction log :

Time	Transaction State	Activity Performed	Type of Transaction	Optional Information
December 4, 2025 11:43:11 AM	End	Execution	Detector Flow Accuracy - Front FID: - Type : Oxidizer - S: 400.0 mL/min - L: <= 10.0% setpoint	Run Count : 1
December 4, 2025 11:43:14 AM	start	Execution	Detector Flow Accuracy - Front FID: - Type : Makeup - S: 25.0 mL/min - L: <= 10.0% setpoint	None
December 4, 2025 11:43:55 AM	End	Execution	Detector Flow Accuracy - Front FID: - Type : Makeup - S: 25.0 mL/min - L: <= 10.0% setpoint	Run Count : 1
December 4, 2025 11:43:58 AM	start	Execution	GC Oven Temperature Accuracy - 8890: - Temperature : Oven - S: 230.0°C - L: >= -1.0 AND <= 1.0 % setpoint in K	None
December 4, 2025 11:44:33 AM	Audit	Data	GC Oven Temperature Accuracy - 8890: - Temperature : Oven - S: 230.0°C - L: >= -1.0 AND <= 1.0 % setpoint in K	Manual Data Entry
December 4, 2025 11:44:35 AM	End	Execution	GC Oven Temperature Accuracy - 8890: - Temperature : Oven - S: 230.0°C - L: >= -1.0 AND <= 1.0 % setpoint in K	Run Count : 1
December 4, 2025 11:44:38 AM	start	Execution	GC Oven Temperature Accuracy - 8890: - Temperature : Oven - S: 100.0°C - L: >= -1.0 AND <= 1.0 % setpoint in K	None
December 4, 2025 11:45:13 AM	Audit	Data	GC Oven Temperature Accuracy - 8890: - Temperature : Oven - S: 100.0°C - L: >= -1.0 AND <= 1.0 % setpoint in K	Manual Data Entry
December 4, 2025 11:45:15 AM	End	Execution	GC Oven Temperature Accuracy - 8890: - Temperature : Oven - S: 100.0°C - L: >= -1.0 AND <= 1.0 % setpoint in K	Run Count : 1

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SPS_OQGCMS_5977B_2025 Transaction log :

Time	Transaction State	Activity Performed	Type of Transaction	Optional Information
December 4, 2025 11:45:18 AM	start	Execution	GC Oven Temperature Stability - 8890: - Temperature : Oven - S: 100.0°C - L: <= 0.5°C	None
December 4, 2025 11:45:54 AM	start	Execution	GC Oven Temperature Stability - 8890: - Temperature : Oven - S: 100.0°C - L: <= 0.5°C	None
December 4, 2025 11:46:34 AM	Audit	Data	GC Oven Temperature Stability - 8890: - Temperature : Oven - S: 100.0°C - L: <= 0.5°C	Manual Data Entry
December 4, 2025 11:46:43 AM	End	Execution	GC Oven Temperature Stability - 8890: - Temperature : Oven - S: 100.0°C - L: <= 0.5°C	Run Count : 1
December 4, 2025 11:46:47 AM	start	Execution	GC Scouting Run - Manual Injection, Back SSL, Back FPD+: - Part of System Preparation - No limits associated	None
December 4, 2025 11:51:39 AM	Audit	Data	GC Scouting Run - Manual Injection, Back SSL, Back FPD+: - Part of System Preparation - No limits associated	Data files Path : C:\Users\Win 10 Home\Desktop\OQPV_GC\SPS OQPV_GCMS 2025\SCFPD02.D
December 4, 2025 11:52:01 AM	Audit	Data	DataManager	DataManager was in a data verification state but the user chose to start over
December 4, 2025 11:55:41 AM	Audit	Data	GC Scouting Run - Manual Injection, Back SSL, Back FPD+: - Part of System Preparation - No limits associated	Data files Path : C:\Users\Win 10 Home\Desktop\OQPV_GC\SPS OQPV_GCMS 2025\SCFPD03.D

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System Id: GC/MS 05/62
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SPS_OQGCMS_5977B_2025 Transaction log :

Time	Transaction State	Activity Performed	Type of Transaction	Optional Information
December 4, 2025 11:55:53 AM	Audit	Reporting	Reintegration	Reintegration Count: 1 -- [Integration Type: Injection;Baseline Correction Mode: Advanced;Initial Slope Sensitivity: 10;Initial Peak Width: 0.01;Initial Area Reject: 0;Initial Height Reject: 100000;Integration: Off at 0;Integration: On at 7]
December 4, 2025 11:56:03 AM	Audit	Reporting	Reintegration	Reintegration Count: 2 -- [Integration Type: Injection;Baseline Correction Mode: Advanced;Initial Slope Sensitivity: 10;Initial Peak Width: 0.01;Initial Area Reject: 0;Initial Height Reject: 100000;Integration: Off at 0;Integration: On at 4]
December 4, 2025 11:57:54 AM	End	Execution	GC Scouting Run - Manual Injection, Back SSL, Back FPD+: - Part of System Preparation - No limits associated	Run Count : 1
December 4, 2025 11:57:59 AM	start	Execution	Signal to Noise - Manual Injection, Back SSL, Back FPD+: - Detector FPD+ - L: >= 1400	None
December 4, 2025 11:58:18 AM	Audit	Data	Signal to Noise - Manual Injection, Back SSL, Back FPD+: - Detector FPD+ - L: >= 1400	Data files Path : C:\Users\Win 10 Home\Desktop\OQPV_GC\SPS OQPV_GCMS 2025\SNFPD01.D

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SPS_OQGCMS_5977B_2025 Transaction log :

Time	Transaction State	Activity Performed	Type of Transaction	Optional Information
December 4, 2025 11:58:55 AM	Audit	Reporting	Reintegration	Reintegration Count: 1 -- [Integration Type: Injection;Baseline Correction Mode: Advanced;Initial Slope Sensitivity: 10;Initial Peak Width: 0.01;Initial Area Reject: 0;Initial Height Reject: 100000;Integration: Off at 0;Integration: On at 7]
December 4, 2025 11:59:04 AM	Audit	Reporting	Reintegration	Reintegration Count: 2 -- [Integration Type: Injection;Baseline Correction Mode: Advanced;Initial Slope Sensitivity: 10;Initial Peak Width: 0.01;Initial Area Reject: 0;Initial Height Reject: 100000;Integration: Off at 0;Integration: On at 2]
December 4, 2025 11:59:10 AM	Audit	Reporting	Reintegration	Reintegration Count: 3 -- [Integration Type: Injection;Baseline Correction Mode: Advanced;Initial Slope Sensitivity: 10;Initial Peak Width: 0.01;Initial Area Reject: 0;Initial Height Reject: 1000000;Integration: Off at 0;Integration: On at 2]
December 4, 2025 11:59:15 AM	Audit	Reporting	Reintegration	Reintegration Count: 4 -- [Integration Type: Injection;Baseline Correction Mode: Advanced;Initial Slope Sensitivity: 10;Initial Peak Width: 0.01;Initial Area Reject: 0;Initial Height Reject: 10000000;Integration: Off at 0;Integration: On at 2]

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SPS_OQGCMS_5977B_2025 Transaction log :

Time	Transaction State	Activity Performed	Type of Transaction	Optional Information
December 4, 2025 11:59:20 AM	Audit	Reporting	Reintegration	Reintegration Count: 5 -- [Integration Type: Injection;Baseline Correction Mode: Advanced;Initial Slope Sensitivity: 10;Initial Peak Width: 0.01;Initial Area Reject: 0;Initial Height Reject: 100000000;Integration: Off at 0;Integration: On at 2]
December 4, 2025 11:59:24 AM	Audit	Reporting	Reintegration	Reintegration Count: 6 -- [Integration Type: Injection;Baseline Correction Mode: Advanced;Initial Slope Sensitivity: 10;Initial Peak Width: 0.01;Initial Area Reject: 0;Initial Height Reject: 1000000000;Integration: Off at 0;Integration: On at 2]
December 4, 2025 12:00:40 PM	End	Execution	Signal to Noise - Manual Injection, Back SSL, Back FPD+: - Detector FPD+ - L: >= 1400	Run Count : 1
December 4, 2025 12:00:48 PM	start	Execution	Noise and Drift - Back FPD+: - Detector FPD+ S-Mode - L (Noise): <= 4.00 150 pA - L (Drift): <= 3.00 150 pA/hour	None
December 4, 2025 12:02:17 PM	Audit	Data	Noise and Drift - Back FPD+: - Detector FPD+ S-Mode - L (Noise): <= 4.00 150 pA - L (Drift): <= 3.00 150 pA/hour	Data files Path : C:\Users\Win 10 Home\Desktop\OQPV_GC\SPS OQPV_GCMS 2025\OQ2025\ND003.D
December 4, 2025 12:02:24 PM	End	Execution	Noise and Drift - Back FPD+: - Detector FPD+ S-Mode - L (Noise): <= 4.00 150 pA - L (Drift): <= 3.00 150 pA/hour	Run Count : 1

User Name: adirek.rattanawijit
System Id: GC/MS 05/62
Report Generated by Hostname: C614-QA
Print Date: December 4, 2025 1:51:09 PM

SPS_OQGCMS_5977B_2025 Transaction log :

Time	Transaction State	Activity Performed	Type of Transaction	Optional Information
December 4, 2025 12:02:33 PM	start	Execution	GC Scouting Run - Injection Tower, Front SSL, Front FID: - Part of System Preparation - No limits associated	None
December 4, 2025 12:02:50 PM	Audit	Data	GC Scouting Run - Injection Tower, Front SSL, Front FID: - Part of System Preparation - No limits associated	Data files Path : C:\Users\Win 10 Home\Desktop\OQPV_GC\SPS OQPV_GCMS 2025\OQ2025\Scout_FID_001.D
December 4, 2025 12:03:11 PM	End	Execution	GC Scouting Run - Injection Tower, Front SSL, Front FID: - Part of System Preparation - No limits associated	Run Count : 1
December 4, 2025 12:03:14 PM	start	Execution	Noise and Drift - Front FID: - Detector FID - L (Noise): <= 0.10 pA - L (Drift): <= 2.50 pA/hour	None
December 4, 2025 12:03:26 PM	Audit	Data	Noise and Drift - Front FID: - Detector FID - L (Noise): <= 0.10 pA - L (Drift): <= 2.50 pA/hour	Data files Path : C:\Users\Win 10 Home\Desktop\OQPV_GC\SPS OQPV_GCMS 2025\OQ2025\ND002.D
December 4, 2025 12:03:31 PM	Audit	Data	DataManager	DataManager was in a data verification state but the user chose to start over
December 4, 2025 12:03:39 PM	Audit	Data	Noise and Drift - Front FID: - Detector FID - L (Noise): <= 0.10 pA - L (Drift): <= 2.50 pA/hour	Data files Path : C:\Users\Win 10 Home\Desktop\OQPV_GC\SPS OQPV_GCMS 2025\OQ2025\ND001.D
December 4, 2025 12:03:52 PM	End	Execution	Noise and Drift - Front FID: - Detector FID - L (Noise): <= 0.10 pA - L (Drift): <= 2.50 pA/hour	Run Count : 1

User Name: adirek.rattanawijit
System Id: GC/MS 05/62
Report Generated by Hostname: C614-QA
Print Date: December 4, 2025 1:51:09 PM

SPS_OQGCMS_5977B_2025 Transaction log :

Time	Transaction State	Activity Performed	Type of Transaction	Optional Information
December 4, 2025 12:03:56 PM	start	Execution	Injection Precision - Injection Tower, Front SSL, Front FID: - GC - L (Area): <= 3.00% - L (Ret. Time): <= 1.00%	None
December 4, 2025 12:04:15 PM	Audit	Data	Injection Precision - Injection Tower, Front SSL, Front FID: - GC - L (Area): <= 3.00% - L (Ret. Time): <= 1.00%	Data files Path : C:\Users\Win 10 Home\Desktop\OQPV_GC\SPS OQPV_GCMS 2025\OQ2025\IP_FID_002.D
December 4, 2025 12:04:15 PM	Audit	Data	Injection Precision - Injection Tower, Front SSL, Front FID: - GC - L (Area): <= 3.00% - L (Ret. Time): <= 1.00%	Data files Path : C:\Users\Win 10 Home\Desktop\OQPV_GC\SPS OQPV_GCMS 2025\OQ2025\IP_FID_003.D
December 4, 2025 12:04:15 PM	Audit	Data	Injection Precision - Injection Tower, Front SSL, Front FID: - GC - L (Area): <= 3.00% - L (Ret. Time): <= 1.00%	Data files Path : C:\Users\Win 10 Home\Desktop\OQPV_GC\SPS OQPV_GCMS 2025\OQ2025\IP_FID_004.D
December 4, 2025 12:04:15 PM	Audit	Data	Injection Precision - Injection Tower, Front SSL, Front FID: - GC - L (Area): <= 3.00% - L (Ret. Time): <= 1.00%	Data files Path : C:\Users\Win 10 Home\Desktop\OQPV_GC\SPS OQPV_GCMS 2025\OQ2025\IP_FID_005.D
December 4, 2025 12:04:15 PM	Audit	Data	Injection Precision - Injection Tower, Front SSL, Front FID: - GC - L (Area): <= 3.00% - L (Ret. Time): <= 1.00%	Data files Path : C:\Users\Win 10 Home\Desktop\OQPV_GC\SPS OQPV_GCMS 2025\OQ2025\IP_FID_006.D
December 4, 2025 12:04:15 PM	Audit	Data	Injection Precision - Injection Tower, Front SSL, Front FID: - GC - L (Area): <= 3.00% - L (Ret. Time): <= 1.00%	Data files Path : C:\Users\Win 10 Home\Desktop\OQPV_GC\SPS OQPV_GCMS 2025\OQ2025\IP_FID_007.D

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SPS_OQGCMS_5977B_2025 Transaction log :

Time	Transaction State	Activity Performed	Type of Transaction	Optional Information
December 4, 2025 12:04:31 PM	End	Execution	Injection Precision - Injection Tower, Front SSL, Front FID: - GC - L (Area): <= 3.00% - L (Ret. Time): <= 1.00%	Run Count : 1
December 4, 2025 12:04:35 PM	start	Execution	Signal to Noise - Injection Tower, Front SSL, Front FID: - Detector FID - L: >= 300000	None
December 4, 2025 12:05:00 PM	Audit	Data	Signal to Noise - Injection Tower, Front SSL, Front FID: - Detector FID - L: >= 300000	Data files Path : C:\Users\Win 10 Home\Desktop\OQPV_GC\SPS OQPV_GCMS 2025\OQ2025\SN_FID_001.D
December 4, 2025 12:05:10 PM	End	Execution	Signal to Noise - Injection Tower, Front SSL, Front FID: - Detector FID - L: >= 300000	Run Count : 1
December 4, 2025 12:05:17 PM	start	Execution	Log Amp - 5977B SQ: - Source: EI - Inert	None
December 4, 2025 12:09:24 PM	start	Execution	RFPA - 5977B SQ: - Source: EI - Inert	None
December 4, 2025 12:19:06 PM	End	Execution	RFPA - 5977B SQ: - Source: EI - Inert	Run Count : 1
December 4, 2025 12:21:23 PM	start	Execution	Scouting Run - Injection Tower, Front SSL, SQ: - Source: - EI - Inert- Part of GCMS System Preparation	None
December 4, 2025 12:21:38 PM	Audit	Data	Scouting Run - Injection Tower, Front SSL, SQ: - Source: - EI - Inert- Part of GCMS System Preparation	Data files Path : C:\Users\Win 10 Home\Desktop\OQPV_GC\SPS OQPV_GCMS 2025\OQ2025\SC01.D

Date: December 4, 2025 1:51:07 PM
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SPS_OQGCMS_5977B_2025 Transaction log :

Time	Transaction State	Activity Performed	Type of Transaction	Optional Information
December 4, 2025 12:21:54 PM	start	Execution	Instrument Detection Limit - Injection Tower, Front SSL, SQ: - Source: - EI - Inert - RSD L (Area): <= 5.00% - RSD L (Ret. Time): <= 1.00%	None
December 4, 2025 12:22:29 PM	Audit	Data	Instrument Detection Limit - Injection Tower, Front SSL, SQ: - Source: - EI - Inert - RSD L (Area): <= 5.00% - RSD L (Ret. Time): <= 1.00%	Data files Path : C:\Users\Win 10 Home\Desktop\OQPV_GC\SPS OQPV_GCMS 2025\OQ2025\IDL002.D
December 4, 2025 12:22:29 PM	Audit	Data	Instrument Detection Limit - Injection Tower, Front SSL, SQ: - Source: - EI - Inert - RSD L (Area): <= 5.00% - RSD L (Ret. Time): <= 1.00%	Data files Path : C:\Users\Win 10 Home\Desktop\OQPV_GC\SPS OQPV_GCMS 2025\OQ2025\IDL003.D
December 4, 2025 12:22:29 PM	Audit	Data	Instrument Detection Limit - Injection Tower, Front SSL, SQ: - Source: - EI - Inert - RSD L (Area): <= 5.00% - RSD L (Ret. Time): <= 1.00%	Data files Path : C:\Users\Win 10 Home\Desktop\OQPV_GC\SPS OQPV_GCMS 2025\OQ2025\IDL004.D
December 4, 2025 12:22:29 PM	Audit	Data	Instrument Detection Limit - Injection Tower, Front SSL, SQ: - Source: - EI - Inert - RSD L (Area): <= 5.00% - RSD L (Ret. Time): <= 1.00%	Data files Path : C:\Users\Win 10 Home\Desktop\OQPV_GC\SPS OQPV_GCMS 2025\OQ2025\IDL005.D
December 4, 2025 12:22:29 PM	Audit	Data	Instrument Detection Limit - Injection Tower, Front SSL, SQ: - Source: - EI - Inert - RSD L (Area): <= 5.00% - RSD L (Ret. Time): <= 1.00%	Data files Path : C:\Users\Win 10 Home\Desktop\OQPV_GC\SPS OQPV_GCMS 2025\OQ2025\IDL006.D
December 4, 2025 12:22:29 PM	Audit	Data	Instrument Detection Limit - Injection Tower, Front SSL, SQ: - Source: - EI - Inert - RSD L (Area): <= 5.00% - RSD L (Ret. Time): <= 1.00%	Data files Path : C:\Users\Win 10 Home\Desktop\OQPV_GC\SPS OQPV_GCMS 2025\OQ2025\IDL007.D

Date: December 4, 2025 1:51:07 PM
System ID: GC/MS 05/62

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System Id: GC/MS 05/62
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Print Date: December 4, 2025 1:51:09 PM

SPS_OQGCMS_5977B_2025 Transaction log :

Time	Transaction State	Activity Performed	Type of Transaction	Optional Information
December 4, 2025 12:22:29 PM	Audit	Data	Instrument Detection Limit - Injection Tower, Front SSL, SQ: - Source: - EI - Inert - RSD L (Area): <= 5.00% - RSD L (Ret. Time): <= 1.00%	Data files Path : C:\Users\Win 10 Home\Desktop\OQPV_GC\SPS OQPV_GCMS 2025\OQ2025\IDL008.D
December 4, 2025 12:22:29 PM	Audit	Data	Instrument Detection Limit - Injection Tower, Front SSL, SQ: - Source: - EI - Inert - RSD L (Area): <= 5.00% - RSD L (Ret. Time): <= 1.00%	Data files Path : C:\Users\Win 10 Home\Desktop\OQPV_GC\SPS OQPV_GCMS 2025\OQ2025\IDL009.D
December 4, 2025 12:22:29 PM	Audit	Data	Instrument Detection Limit - Injection Tower, Front SSL, SQ: - Source: - EI - Inert - RSD L (Area): <= 5.00% - RSD L (Ret. Time): <= 1.00%	Data files Path : C:\Users\Win 10 Home\Desktop\OQPV_GC\SPS OQPV_GCMS 2025\OQ2025\IDL010.D
December 4, 2025 12:22:29 PM	Audit	Data	Instrument Detection Limit - Injection Tower, Front SSL, SQ: - Source: - EI - Inert - RSD L (Area): <= 5.00% - RSD L (Ret. Time): <= 1.00%	Data files Path : C:\Users\Win 10 Home\Desktop\OQPV_GC\SPS OQPV_GCMS 2025\OQ2025\IDL011.D
December 4, 2025 12:22:54 PM	Audit	Reporting	Reintegration	Reintegration Count: 1 -- [Integration Type: Injection;Baseline Correction Mode: Advanced;Initial Slope Sensitivity: 10;Initial Peak Width: 0.01;Initial Area Reject: 0;Initial Height Reject: 50;Integration: Off at 0;Integration: On at 4.5]
December 4, 2025 12:23:13 PM	End	Execution	Instrument Detection Limit - Injection Tower, Front SSL, SQ: - Source: - EI - Inert - RSD L (Area): <= 5.00% - RSD L (Ret. Time): <= 1.00%	Run Count : 1

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System Id: GC/MS 05/62
Report Generated by Hostname: C614-QA
Print Date: December 4, 2025 1:51:09 PM

SPS_OQGCMS_5977B_2025 Transaction log :

Time	Transaction State	Activity Performed	Type of Transaction	Optional Information
December 4, 2025 12:23:20 PM	start	Execution	Scouting Run - Injection Tower, Front SSL, SQ: - Source: - EI - Inert- Part of GCMS System Preparation	None
December 4, 2025 12:23:30 PM	start	Execution	Scouting Run - Injection Tower, Front SSL, SQ: - Source: - EI - Inert- Part of GCMS System Preparation	None
December 4, 2025 12:25:04 PM	End	Execution	Scouting Run - Injection Tower, Front SSL, SQ: - Source: - EI - Inert- Part of GCMS System Preparation	Run Count : 1
December 4, 2025 12:25:08 PM	start	Execution	Mass Ratio Precision - Injection Tower, Front SSL, SQ: - Source: EI - Inert - L (RSD): <= 5.00%	None
December 4, 2025 12:25:31 PM	Audit	Data	Mass Ratio Precision - Injection Tower, Front SSL, SQ: - Source: EI - Inert - L (RSD): <= 5.00%	Data files Path : C:\Users\Win 10 Home\Desktop\OQPV_GC\SPS OQPV_GCMS 2025\OQ2025\MRP002.D
December 4, 2025 12:25:31 PM	Audit	Data	Mass Ratio Precision - Injection Tower, Front SSL, SQ: - Source: EI - Inert - L (RSD): <= 5.00%	Data files Path : C:\Users\Win 10 Home\Desktop\OQPV_GC\SPS OQPV_GCMS 2025\OQ2025\MRP003.D
December 4, 2025 12:25:31 PM	Audit	Data	Mass Ratio Precision - Injection Tower, Front SSL, SQ: - Source: EI - Inert - L (RSD): <= 5.00%	Data files Path : C:\Users\Win 10 Home\Desktop\OQPV_GC\SPS OQPV_GCMS 2025\OQ2025\MRP004.D

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User Name: adirek.rattanawijit
Report Generated by Hostname: C614-QA
System Id: GC/MS 05/62
Print Date: December 4, 2025 1:51:09 PM

SPS_OQGCMS_5977B_2025 Transaction log :

Time	Transaction State	Activity Performed	Type of Transaction	Optional Information
December 4, 2025 12:25:31 PM	Audit	Data	Mass Ratio Precision - Injection Tower, Front SSL, SQ: - Source: EI - Inert - L (RSD): <= 5.00%	Data files Path : C:\Users\Win 10 Home\Desktop\OQPV_GC\SPS OQPV_GCMS 2025\OQ2025\MRP005.D
December 4, 2025 12:25:31 PM	Audit	Data	Mass Ratio Precision - Injection Tower, Front SSL, SQ: - Source: EI - Inert - L (RSD): <= 5.00%	Data files Path : C:\Users\Win 10 Home\Desktop\OQPV_GC\SPS OQPV_GCMS 2025\OQ2025\MRP006.D
December 4, 2025 12:25:31 PM	Audit	Data	Mass Ratio Precision - Injection Tower, Front SSL, SQ: - Source: EI - Inert - L (RSD): <= 5.00%	Data files Path : C:\Users\Win 10 Home\Desktop\OQPV_GC\SPS OQPV_GCMS 2025\OQ2025\MRP007.D
December 4, 2025 12:25:47 PM	Audit	Reporting	Reintegration	Reintegration Count: 1 -- [Integration Type: Injection;Baseline Correction Mode: Advanced;Initial Slope Sensitivity: 10;Initial Peak Width: 0.01;Initial Area Reject: 0;Initial Height Reject: 50000;Integration: Off at 0;Integration: On at 4.6]
December 4, 2025 12:26:01 PM	End	Execution	Mass Ratio Precision - Injection Tower, Front SSL, SQ: - Source: EI - Inert - L (RSD): <= 5.00%	Run Count : 1
December 4, 2025 1:31:04 PM	start	Execution	Log Amp - 5977B SQ: - Source: EI - Inert	None
December 4, 2025 1:32:04 PM	End	Execution	Log Amp - 5977B SQ: - Source: EI - Inert	Run Count : 1
December 4, 2025 1:33:18 PM	start	Execution	Tune EI - 5977B SQ: - Source: - EI - Inert Filament 1 (Qualitative - No setpoints associated)	None

User Name: adirek.rattanawijit
Report Generated by Hostname: C614-QA
System Id: GC/MS 05/62
Print Date: December 4, 2025 1:51:09 PM

SPS_OQGCMS_5977B_2025 Transaction log :

Time	Transaction State	Activity Performed	Type of Transaction	Optional Information
December 4, 2025 1:33:38 PM	End	Execution	Tune EI - 5977B SQ: - Source: - EI - Inert Filament 1 (Qualitative - No setpoints associated)	Run Count : 1
December 4, 2025 1:33:41 PM	start	Execution	Tune EI - 5977B SQ: - Source: - EI - Inert Filament 2 (Qualitative - No setpoints associated)	None
December 4, 2025 1:33:59 PM	End	Execution	Tune EI - 5977B SQ: - Source: - EI - Inert Filament 2 (Qualitative - No setpoints associated)	Run Count : 1
December 4, 2025 1:34:04 PM	End	Qualification	Session	OQ
December 4, 2025 1:34:04 PM	start	Reporting	Session	None
December 4, 2025 1:46:22 PM	Audit	Reporting	Session	Report Generated : Certificate
December 4, 2025 1:47:02 PM	Audit	Reporting	Session	Report Generated : Report
December 4, 2025 1:47:58 PM	Audit	AceClosed	Session	None
December 4, 2025 1:48:35 PM	Audit	AceRestarted	Session	Host Name: C614-QA, Drive Serial Number: 42776F5E
December 4, 2025 1:48:38 PM	Audit	SessionReloaded	Session	None
December 4, 2025 1:48:42 PM	start	Qualification	Session	OQ
December 4, 2025 1:49:52 PM	Audit	Reporting	Session	Report Generated : Certificate
December 4, 2025 1:50:32 PM	Audit	Reporting	Session	Report Generated : Report

คุณภาพอากาศในสถานประกอบการ

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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	R^2
B01	SKC	224-PCXR4	262101	03/10/2025	1,000	1,500	2,000	998	1,490	1,997	1.000x – 7.191	1.000
B02	SKC	224-PCXR4	626166	03/10/2025	1,000	1,500	2,000	1,007	1,500	2,008	0.999x + 2.537	1.000
B03	SKC	224-PCXR4	612968	03/10/2025	1,000	1,500	2,000	1,003	1,503	2,001	0.997x + 0.810	0.999
B04	SKC	224-PCXR4	602804	02/10/2025	1,000	1,500	2,000	998	1,494	1,993	1.001x - 6.035	1.000
B05	SKC	224-PCXR4	612693	02/10/2025	1,000	1,500	2,000	999	1,495	2,001	0.999x – 2.481	1.000
B06	SKC	224-PCXR4	262188	02/10/2025	1,000	1,500	2,000	997	1,510	2,000	0.998x + 0.064	0.999
B07	SKC	224-PCXR4	626262	01/10/2025	1,000	1,500	2,000	1,004	1,492	2,007	1.002x - 4.778	1.000
B08	SKC	224-PCXR4	626100	02/10/2025	1,000	1,500	2,000	1,005	1,500	2,005	1.004x – 7.223	1.000
B09	SKC	224-PCXR4	626479	01/10/2025	1,000	1,500	2,000	1,001	1,501	1,986	0.996x + 3.462	0.999
B10	SKC	224-PCXR4	091950	01/10/2025	1,000	1,500	2,000	997	1,504	2,000	1.003x – 8.822	1.000
B11	SKC	224-PCXR8	564315	03/10/2025	1,000	1,500	2,000	1,001	1,503	1,995	0.995x + 2.449	1.000
B12	SKC	224-PCXR4	034656	03/10/2025	1,000	1,500	2,000	997	1,506	2,003	1.003x - 9.062	0.999
B13	SKC	224-PCXR4	602073	03/10/2025	1,000	1,500	2,000	1,003	1,497	2,006	1.002x - 5.013	1.000
B14	SKC	224-PCXR4	626313	03/10/2025	1,000	1,500	2,000	998	1,501	1,992	1.005x - 11.702	0.999
B15	SKC	224-PCXR4	626474	03/10/2025	1,000	1,500	2,000	1,001	1,502	2,004	1.006x - 11.694	1.000
B16	SKC	224-PCXR4	626477	03/10/2025	1,000	1,500	2,000	996	1,498	1,992	1.007x - 16.329	0.999
B17	SKC	224-PCXR4	626860	02/10/2025	1,000	1,500	2,000	1,001	1,503	1,998	1.001x - 4.838	1.000
B18	SKC	224-PCXR4	691484	01/10/2025	1,000	1,500	2,000	997	1,514	1,996	0.996x + 5.360	1.000
B19	SKC	224-PCXR4	691599	01/10/2025	1,000	1,500	2,000	998	1,499	2,003	0.998x + 0.399	1.000
B20	SKC	224-PCXR4	691587	01/10/2025	1,000	1,500	2,000	1,001	1,501	1,999	0.995x + 1.520	0.999
B21	SKC	224-PCXR4	691531	03/10/2025	1,000	1,500	2,000	996	1,502	2,001	1.003x - 7.151	1.000
B22	SKC	224-PCXR4	691654	03/10/2025	1,000	1,500	2,000	1,001	1,500	1,998	0.997x - 0.666	1.000
B23	SKC	224-PCXR4	798393	03/10/2025	1,000	1,500	2,000	993	1,507	1,999	1.007x - 17.505	0.999
B24	SKC	224-PCXR4	626363	03/10/2025	1,000	1,500	2,000	994	1,498	1,995	1.000x – 3.941	1.000
B25	SKC	224-PCXR4	798489	01/10/2025	1,000	1,500	2,000	1,003	1,490	2,001	0.997x + 1.703	1.000
B26	SKC	224-PCXR4	798479	01/10/2025	1,000	1,500	2,000	1,001	1,509	1,995	1.002x - 8.057	0.999
B27	SKC	224-PCXR4	691673	01/10/2025	1,000	1,500	2,000	998	1,510	2,002	1.005x - 9.656	1.000
B28	SKC	224-PCXR4	691570	01/10/2025	1,000	1,500	2,000	1,011	1,508	2,009	0.999x + 3.729	0.999
B29	SKC	224-PCXR4	626472	01/10/2025	1,000	1,500	2,000	1,002	1,503	1,998	1.002x - 6.066	1.000
B30	SKC	224-PCXR4	691489	01/10/2025	1,000	1,500	2,000	997	1,506	2,001	1.004x – 8.049	1.000
B31	SKC	224-PCXR4	691509	02/10/2025	1,000	1,500	2,000	995	1,497	1,992	0.998x – 2.293	1.000
B32	SKC	224-PCXR4	091567	01/10/2025	1,000	1,500	2,000	1,002	1,500	2,003	1.008x - 15.778	0.999
B33	SKC	224-PCXR4	091756	02/10/2025	1,000	1,500	2,000	1,003	1,501	1,997	1.003x – 6.509	1.000
B34	SKC	224-PCXR4	612962	01/10/2025	1,000	1,500	2,000	996	1,512	1,996	1.001x - 5.867	0.999
B35	SKC	224-PCXR4	602682	01/10/2025	1,000	1,500	2,000	1,008	1,494	1,999	0.993x + 6.992	1.000
B36	SKC	224-PCXR4	626164	01/10/2025	1,000	1,500	2,000	997	1,502	1,992	0.999x - 3.235	1.000
B37	SKC	224-PCXR4	626256	01/10/2025	1,000	1,500	2,000	1,003	1,490	1,997	0.994x + 5.095	1.000
B38	SKC	224-PCXR4	626167	02/10/2025	1,000	1,500	2,000	998	1,513	1,995	1.000x - 5.277	0.999
B39	SKC	224-PCXR4	034637	03/10/2025	1,000	1,500	2,000	1,007	1,504	2,004	0.996x + 8.240	1.000
B40	SKC	224-PCXR4	798349	03/10/2025	1,000	1,500	2,000	998	1,510	2,002	0.998x + 3.905	1.000

Calibrated by : Adul Dangklom (Mr. Adul Dangklom)

Approved by : (Mr. Peera Detudom)

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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	R^2
B41	SKC	224-PCXR4	612669	01/10/2025	1,000	1,500	2,000	1,010	1,508	2,009	1.000x + 2.612	0.999
B42	SKC	224-PCXR4	626041	02/10/2025	1,000	1,500	2,000	1,004	1,494	1,994	0.997x + 1.344	1.000
B43	SKC	224-PCXR4	034636	01/10/2025	1,000	1,500	2,000	998	1,505	2,002	1.001x - 5.177	1.000
B44	SKC	224-PCXR8	529341	01/10/2025	1,000	1,500	2,000	999	1,496	1,998	0.996x + 0.909	1.000
B45	SKC	224-PCXR8	529594	01/10/2025	1,000	1,500	2,000	996	1,510	1,992	1.005x - 11.543	1.000
B46	SKC	224-PCXR8	566743	01/10/2025	1,000	1,500	2,000	1,003	1,488	1,997	0.994x + 3.717	1.000
B47	SKC	224-PCXR8	566747	01/10/2025	1,000	1,500	2,000	1,004	1,500	1,993	0.996x + 2.230	1.000
B48	SKC	224-PCXR8	566753	01/10/2025	1,000	1,500	2,000	1,002	1,501	1,991	1.000x - 4.116	0.999
B49	SKC	224-PCXR8	566780	01/10/2025	1,000	1,500	2,000	995	1,502	1,990	0.997x - 1.978	1.000
B50	SKC	224-PCXR8	500400	02/10/2025	1,000	1,500	2,000	997	1,503	2,001	1.004x - 10.178	1.000
B51	SKC	224-PCXR8	500363	01/10/2025	1,000	1,500	2,000	1,001	1,502	1,993	0.995x + 2.848	1.000
B52	SKC	224-PCXR8	093186	03/10/2025	1,000	1,500	2,000	996	1,510	1,999	1.005x - 12.252	0.999
B53	SKC	224-PCXR8	707670	03/10/2025	1,000	1,500	2,000	1,002	1,496	2,004	1.003x - 8.791	1.000
B54	SKC	224-PCXR3	509821	03/10/2025	1,000	1,500	2,000	999	1,501	1,995	0.999x - 2.090	1.000
B55	SKC	224-PCXR3	510710	02/10/2025	1,000	1,500	2,000	1,002	1,503	2,006	1.007x - 13.250	0.999
B56	SKC	224-PCXR3	511450	01/10/2025	1,000	1,500	2,000	995	1,505	1,997	1.002x - 7.594	1.000
B57	SKC	224-PCXR3	510798	02/10/2025	1,000	1,500	2,000	998	1,500	1,994	0.999x - 7.163	0.999
B58	SKC	224-PCXR3	509852	03/10/2025	1,000	1,500	2,000	1,002	1,494	1,996	0.993x + 6.485	1.000
B59	SKC	224-PCXR3	509862	01/10/2025	1,000	1,500	2,000	1,006	1,505	1,998	0.996x + 5.117	1.000
B60	SKC	224-PCXR3	512655	02/10/2025	1,000	1,500	2,000	1,004	1,501	2,003	1.010x - 14.223	0.999
B61	SKC	224-PCXR3	503915	03/10/2025	1,000	1,500	2,000	993	1,495	1,994	0.999x - 4.942	1.000
B62	SKC	224-PCXR3	505975	03/10/2025	1,000	1,500	2,000	995	1,500	2,005	1.009x - 16.396	1.000
B63	SKC	224-PCXR3	511432	03/10/2025	1,000	1,500	2,000	996	1,497	1,991	0.998x - 3.171	1.000
B64	SKC	224-PCXR3	508302	03/10/2025	1,000	1,500	2,000	1,008	1,506	1,998	0.992x + 8.667	0.999
B65	SKC	224-PCXR3	508310	03/10/2025	1,000	1,500	2,000	1,006	1,492	2,003	1.000x - 4.355	1.000
B66	SKC	224-PCXR3	509861	03/10/2025	1,000	1,500	2,000	994	1,496	1,994	0.997x - 0.275	1.000
B67	SKC	224-PCXR3	506295	01/10/2025	1,000	1,500	2,000	997	1,505	2,001	1.004x - 10.258	1.000
B68	SKC	224-PCXR3	505872	03/10/2025	1,000	1,500	2,000	998	1,512	1,992	0.999x - 3.554	0.999
B69	SKC	224-PCXR3	508375	01/10/2025	1,000	1,500	2,000	997	1,489	1,996	0.997x - 2.309	1.000
B70	SKC	224-PCXR3	510623	03/10/2025	1,000	1,500	2,000	1,001	1,496	1,991	0.992x + 7.131	1.000
B71	SKC	224-PCXR3	508367	03/10/2025	1,000	1,500	2,000	999	1,498	1,995	0.996x + 6.433	1.000
B72	SKC	224-PCXR3	505977	03/10/2025	1,000	1,500	2,000	996	1,507	1,999	1.003x - 7.490	1.000
B73	SKC	224-PCXR3	512606	03/10/2025	1,000	1,500	2,000	1,004	1,503	2,003	1.001x - 5.285	0.999
B74	SKC	224-PCXR3	505993	01/10/2025	1,000	1,500	2,000	1,006	1,501	1,997	0.993x + 8.232	1.000
B75	SKC	224-PCXR3	509820	02/10/2025	1,000	1,500	2,000	1,005	1,494	1,995	0.997x - 2.979	0.999
B76	SKC	224-PCXR3	509811	02/10/2025	1,000	1,500	2,000	996	1,503	1,999	1.005x - 10.613	1.000
B77	SKC	224-PCXR3	508301	01/10/2025	1,000	1,500	2,000	1,003	1,490	1,998	0.994x + 4.694	1.000
B78	SKC	224-PCXR3	510677	01/10/2025	1,000	1,500	2,000	1,004	1,492	1,997	0.995x + 4.036	1.000
B79	SKC	224-PCXR3	510920	01/10/2025	1,000	1,500	2,000	1,008	1,504	2,006	1.006x - 9.588	0.999

Calibrated by : Adul Dangklom (Mr. Adul Dangklom)

Approved by : (Mr. Peera Detudom)

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) 513-4321. 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	R^2
B80	SKC	224-PCXR3	504569	01/10/2025	1,000	1,500	2,000	1,004	1,510	2,004	0.999x - 0.786	0.999
B81	SKC	224-PCXR3	503480	01/10/2025	1,000	1,500	2,000	1,004	1,509	2,002	1.000x - 1.340	0.999
B82	SKC	224-PCXR3	505673	01/10/2025	1,000	1,500	2,000	1,007	1,502	2,003	0.994x+ 9.425	1.000
B83	SKC	224-PCXR3	510785	01/10/2025	1,000	1,500	2,000	997	1,494	1,994	0.999x - 1.727	0.999
B84	SKC	224-PCXR3	508333	01/10/2025	1,000	1,500	2,000	1,000	1,505	2,005	1.002x - 5.217	1.000
B85	SKC	224-PCXR3	505757	03/10/2025	1,000	1,500	2,000	996	1,507	1,998	1.001x - 4.459	1.000
B86	SKC	224-PCXR3	512625	03/10/2025	1,000	1,500	2,000	998	1,506	1,993	0.997x - 4.180	0.999
B87	SKC	224-PCXR3	504324	03/10/2025	1,000	1,500	2,000	1,003	1,510	2,004	1.000x + 1.037	1.000
B88	SKC	224-PCXR3	508307	03/10/2025	1,000	1,500	2,000	995	1,505	1,999	1.007x - 17.485	0.999
B89	SKC	224-PCXR3	509860	03/10/2025	1,000	1,500	2,000	999	1,500	2,001	1.002x - 6.218	1.000
B90	SKC	224-PCXR3	508366	02/11/2025	1,000	1,500	2,000	996	1,505	2,004	1.008x - 15.379	1.000
B91	SKC	224-PCXR3	510919	01/10/2025	1,000	1,500	2,000	1,004	1,504	2,003	0.998x + 1.328	1.000
B92	SKC	224-PCXR3	510987	03/10/2025	1,000	1,500	2,000	997	1,505	2,005	1.009x - 17.601	0.999
B93	SKC	224-PCXR3	509845	03/10/2025	1,000	1,500	2,000	1,006	1,511	2,001	0.998x + 2.138	0.999

Calibrated by : Adul Dangklom (Mr. Adul Dangklom)

Approved by : (Mr. Peera Detudom)

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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

Rotameter Calibration Report (For Personal Pump High Flow Adjust)

Calibration Method : Dry Cal Primary Flowmeter	Model : Defender 510-H	S/N : 136164

Calibration Data

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^2
H-B01	Dwyer	VFB-65	01/10/2025	500	1,000	2,000	502.3	998.1	1996.9	0.999x + 2.995	1.000
H-B02	Dwyer	VFB-65	01/10/2025	500	1,000	2,000	501.2	998.9	1998.1	0.998x + 4.159	1.000
H-B03	Dwyer	VFB-65	01/10/2025	500	1,000	2,000	500.4	999.5	2000.3	1.000x - 1.574	0.999
H-B04	Dwyer	VFB-65	01/10/2025	500	1,000	2,000	499.5	1000.6	1999.5	0.999x + 0.880	1.000
H-B05	Dwyer	VFB-65	01/10/2025	500	1,000	2,000	499.1	1001.3	2001.6	1.001x - 7.095	0.999
H-B06	Dwyer	VFB-65	01/10/2025	500	1,000	2,000	499.4	999.8	1994.1	1.000x + 2.760	1.000
H-B07	Dwyer	VFB-65	02/10/2025	500	1,000	2,000	501.0	999.4	2000.7	0.997x + 1.623	1.000
H-B08	Dwyer	VFB-65	01/10/2025	500	1,000	2,000	499.9	1001.7	2002.8	0.998x - 1.887	1.000
H-B09	Dwyer	VFB-65	02/10/2025	500	1,000	2,000	499.3	999.2	1996.6	0.999x + 1.428	0.999
H-B10	Dwyer	VFB-65	03/10/2025	500	1,000	2,000	498.7	1001.1	1997.8	0.996x + 6.669	1.000

Calibrated by : Adul Dangklom (Mr.Adul Dangklom)

Approved by : (Mr. Peera Detudom)

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

Rotameter Calibration Report (For Personal Pump Low Flow Adjust)

Calibration Method : Dry Cal Primary Flowmeter	Model : Defender 510-H	S/N : 136164

Calibration Data

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^2
L-B01	Dwyer	VFA-21	01/10/2025	50	100	200	50.7	99.8	199.6	1.000x + 0.067	1.000
L-B02	Dwyer	VFA-21	01/10/2025	50	100	200	50.2	99.4	198.7	1.001x - 1.181	0.999
L-B03	Dwyer	VFA-21	01/10/2025	50	100	200	50.8	99.2	201.5	1.002x + 0.053	1.000
L-B04	Dwyer	VFA-21	01/10/2025	50	100	200	49.7	101.6	200.8	1.001x + 0.344	1.000
L-B05	Dwyer	VFA-21	01/10/2025	50	100	200	50.5	100.4	201.6	0.998x + 0.225	0.999
L-B06	Dwyer	VFA-21	01/10/2025	50	100	200	50.1	100.5	201.8	1.003x - 0.103	1.000
L-B07	Dwyer	VFA-21	02/10/2025	50	100	200	50.6	100.8	201.3	0.998x + 0.877	1.000
L-B08	Dwyer	VFA-21	01/10/2025	50	100	200	49.8	101.3	198.9	1.000x - 0.165	1.000
L-B09	Dwyer	VFA-21	02/10/2025	50	100	200	50.1	99.6	200.7	1.002x - 0.766	0.999
L-B10	Dwyer	VFA-21	03/10/2025	50	100	200	50.9	100.8	201.2	1.003x + 0.694	1.000

Calibrated by : Adul Dangklom (Mr.Adul Dangklom)

Approved by : (Mr. Peera Detudom)

ARCHEMICA

Certificate of Calibration

Aquion : Anion (ID#894)

This certificate is to verify that instrument below are calibrated

by Archemica Lab Co.,Ltd.

AQUION S/N : 190840059

AS-DV S/N : 190915235

for

S.P.S. Consulting Service Co., Ltd.

ARCHEMICA LAB
บริษัท อาร์เคมีก้า แลบ จำกัด
ARCHEMICA LAB CO.,LTD.

Operator Signature : Teerapat B Date : Jun 6, 2025

(Mr. Teerapat Boonla)

Application Chemist

บริษัท สมาร์ท เอ็นไวรอนเมนทอล คอลซัลแตนท์ จำกัด

SMART TECH CALIBRATION & SERVICES CO., LTD.
14/506 MOO 3, RANGSIT-NAKHON NAYOK ROAD, LAM PHAK KUT,
THANYABURI, PATHUM THANI 12110, THAILAND
Tel. +662-114-3148 Email : stcal.md@gmail.com Website : stc-cal.com

ANAB ANSI National Accreditation Board ACCREDITED CALIBRATION LABORATORY AC-3093

Certificate of Calibration

Certificate No. STCR-2504036-2
Work Order No. STCR-2504036

Customer Name	:	Smart Environmental Consultants Co., Ltd. 225/6 Moo 3, Banchang, Mueang Pathumthani, Pathumthani 12000
Equipment Name	:	pH Meter
Manufacturer	:	EUTECH
Model	:	pH 700
Serial Number	:	3133752
Control Number	:	PH-001
Received Date	:	Apr 16, 2025
Calibration Date	:	Apr 17, 2025
Recommended Due Date	:	Apr 17, 2026
Calibration Method	:	Calibration Procedure No. CPC-04-01
Environmental Conditions		
Ambient Temperature	:	(25 ± 10) °C
Ambient Relative Humidity	:	(50 ± 30) %RH
Calibration Place	:	Calibration performed at Customer's facility
Condition as received	:	Normal
Calibration Result	:	See data attached

1. The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor k = 2, providing a level of confidence of approximately 95%.
2. The Unit Under Calibration (UUC) has been calibrated by using the working standard which is traceable to SI-Units. The calibration procedure documented is intended to implement the requirements of ISO/IEC 17025 : 2017
3. The working standard is indicated in page 2 of this certificate.
4. This report applies to the item calibrated and shall not be reproduced except in full, without written approval by Calibration Laboratory, Smart Tech Calibration & Services Co., Ltd.
5. This results of this report only to the items calibrated.

Date of Issue : Apr 21, 2025
Calibrated by : Y. Perapon

Approved by :
(Mr.Chayut Wongleang)
Laboratory Manager

@smarttechcal

Calibration Report

Smart Tech Calibration & Services Co., Ltd.

Certificate No.: STCR-2504036-2

Standards Equipment Used

Equipment Name	Ref No.	Certificate No.	Due Date	Traceability to
pH Standard Solution 4.00 pH	PH004.L5	Lot No. 952166	Jan 11, 2026	CPAchem
pH Standard Solution 7.00 pH	PH007.L5	Lot No. 952167	Jan 11, 2026	CPAchem
pH Standard Solution 10.00 pH	PH010.L5	Lot No. 952168	Jan 11, 2026	CPAchem

Traceability

This calibration is traceable to the International System of Unit via :

- CPAchem : CPAchem Ltd. (ANAB Cert No AR-1835)

STC TM

Calibration Report

Smart Tech Calibration & Services Co., Ltd.

Certificate No.: STCR-2504036-2

Results of Calibration: [ ] Without adjustment [✓] With adjustment

Appearance and Function of Use Inspection : GOOD

Result of pH Measurement at 20 °C

STD. Value	UUC Reading		Correction	(±) Uncertainty
	Before Adjustment	After Adjustment		
4.00 pH	4.18 pH	4.01 pH	-0.01 pH	0.010 pH
7.00 pH	5.84 pH	7.00 pH	0.00 pH	0.010 pH
10.00 pH	7.57 pH	10.01 pH	-0.01 pH	0.017 pH

STD = Standard

UUC = Unit Under Calibration

- End of Certificate -

SMART TECH CALIBRATION & SERVICES CO., LTD.
14/506 MOO 3, RANGSIT-NAKHON NAYOK ROAD, LAM PHAK KUT,
THANYABURI, PATHUM THANI 12110, THAILAND
Tel. +662-114-3148 Email : stcal.md@gmail.com Website : stc-cal.com

ilac-MRA ANAB ANSI National Accreditation Board ACCREDITED CALIBRATION LABORATORY AC-3093

Certificate of Calibration

Certificate No. STCR-2504036-4
Work Order No. STCR-2504036

Customer Name : Smart Environmental Consultants Co., Ltd.
225/6 Moo 3, Banchang, Mueang Pathumthani, Pathumthani 12000

Equipment Name : Electronic Balance
Manufacturer : JOANLAB
Model : FA2204
Serial Number : 1022503208
Control Number : BL002
Received Date : Apr 16, 2025
Calibration Date : Apr 17, 2025
Recommended Due Date : Apr 17, 2026
Calibration Method : Calibration Procedure No. CPM-04-03

Environmental Conditions
Ambient Temperature : (25 ± 10) °C Atmospheric Pressure : (950 to 1050) hPa
Ambient Relative Humidity : (50 ± 30) %RH
Calibration Place : Calibration performed at Customer's facility

Condition as received : Normal
Calibration Result : See data attached

1. The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor k = 2, providing a level of confidence of approximately 95%.
2. The Unit Under Calibration (UUC) has been calibrated by using the working standard which is traceable to SI-Units. The calibration procedure documented is intended to implement the requirements of ISO/IEC 17025 : 2017
3. The working standard is indicated in page 2 of this certificate.
4. This report applies to the item calibrated and shall not be reproduced except in full, without written approval by Calibration Laboratory, Smart Tech Calibration & Services Co., Ltd
5. This results of this report only to the items calibrated.

Date of Issue : Apr 21, 2025
Calibrated by : M. Teaw

Approved by :
(Mr. Chayut Wongleang)
Laboratory Manager

@smarttechcal

Calibration Report

Smart Tech Calibration & Services Co., Ltd.

Certificate No.: STCR-2504036-4 Page 2 of 3

Standards Equipment Used

Equipment Name	Serial No.	Certificate No.	Due Date	Traceability to
Standard Weight Set	ID.STC-STD042	B0-01101025/25	Jan 13, 2026	THC

Traceability

This calibration is traceable to the International System of Unit via :

- THC : Thai Heart Calibration Co., Ltd.

STC TM

Calibration Report

Smart Tech Calibration & Services Co., Ltd.

Certificate No.: STCR-2504036-4 Page 3 of 3

Range capacity : 0 to 220 g Resolution: 0.0001 g

Appearance and Function of Use Inspection : GOOD

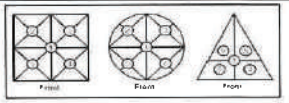
1. Repeatability. (n = 10, n = Number of Measurement)

Load (g)	Standard deviation of reading. (g)	Maximum difference between successive reading. (g)
100	0.0000	0.0000
200	0.0000	0.0000

2. Effect of off center loading.

A mass of 100 g was placed to various positions on the pan

The weighing machine reading error obtained is given in table.



Position 1	Position 2	Position 3	Position 4	Position 5	Maximum difference
100.0000	100.0000	99.9999	99.9993	100.0000	0.0007

3. Linearity

Nominal value (g)	UUC Reading (g)	Correction (g)	Uncertainty of Measurement (± g)
No Load	0.0000	0.0000	0.00015
1.0	1.0000	0.0000	0.00032
20.0	20.0001	-0.0001	0.00032
40.0	40.0001	-0.0001	0.00052
60.0	60.0000	0.0000	0.00052
80.0	80.0000	0.0000	0.00052
100.0	100.0000	0.0000	0.00056
120.0	120.0000	0.0000	0.00064
140.0	140.0001	-0.0001	0.00064
160.0	160.0000	0.0000	0.00064
180.0	180.0001	-0.0001	0.00066
200.0	200.0000	0.0000	0.00064

4. Hysteresis

Load (g)	Hysteresis (g)
100	0.0000

UUC = Unit Under Calibration

- End of Certificate -

STC TM

SMART TECH CALIBRATION & SERVICES CO., LTD.
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ilac-MRA

ANAB
ANSI National Accreditation Board
ACCREDITED
CALIBRATION LABORATORY
AC-3093

Certificate of Calibration

Certificate No. STCR-2504036-1
Work Order No. STCR-2504036

Customer Name : Smart Environmental Consultants Co., Ltd.
225/6 Moo 3, Banchang, Mueang Pathumthani, Pathumthani 12000

Equipment Name	:	Hot Air Oven
Manufacturer	:	Memmert
Model	:	UF55
Serial Number	:	B222.3378
Control Number	:	Oven-001
Received Date	:	Apr 16, 2025
Calibration Date	:	Apr 17, 2025
Recommended Due Date	:	Apr 17, 2026
Calibration Method	:	Calibration Procedure No. CPT-04-01

Environmental Conditions

Ambient Temperature	:	(25 ± 10) °C
Ambient Relative Humidity	:	(50 ± 30) %RH
Calibration Place	:	Calibration performed at Customer's facility

Condition as received	:	Normal
Calibration Result	:	See data attached

1. The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor k = 2, providing a level of confidence of approximately 95%.
2. The Unit Under Calibration (UUC) has been calibrated by using the working standard which is traceable to SI-Units. The calibration procedure documented is intended to implement the requirements of ISO/IEC 17025 : 2017
3. The working standard is indicated in page 2 of this certificate.
4. This report applies to the item calibrated and shall not be reproduced except in full, without written approval by Calibration Laboratory, Smart Tech Calibration & Services Co., Ltd.
5. This results of this report only to the items calibrated.

Date of Issue : Apr 21, 2025
Calibrated by : M. Teaw

Approved by :
(Mr.Crayut Wongkeang)
Laboratory Manager

@smarttechcal

Calibration Report

Smart Tech Calibration & Services Co., Ltd.

Certificate No.: STCR-2504036-1

Standards Equipment Used

Equipment Name	Serial No.	Certificate No.	Due Date	Traceability to
Data Acquisition Switch	MY41015121	5523631031409004	Nov 27, 2025	MP-TH

Traceability

This calibration is traceable to the International System of Unit via :
- MP-TH : Micro Precision Calibration Laboratory (Thailand) Co., Ltd.

STC TM

Calibration Report

Smart Tech Calibration & Services Co., Ltd.

Certificate No.: STCR-2504036-1

Result of Chamber Performance.

Calibration Temperature (°C)	Setting Temperature (°C)	Indicating Temperature (°C)	Measured Stability[1] (°C)	Measured Uniformity[2] (°C)	Overall Variation[3] (°C)
104	104	104.0	0.52	1.11	1.01
180	180	180.0	0.59	1.18	1.01

Result of temperature distribution.

Calibration Temperature (°C)	Standard Reading (°C) @ Sensor No. (Sensor No.9 is REF)									Average (°C)	Uncertainty[4] (±°C)
	No. 1	No. 2	No. 3	No. 4	No. 5	No. 6	No. 7	No. 8	No. 9		
104	103.91	104.00	104.34	104.09	103.94	103.75	103.48	104.22	103.66	103.93	0.70
180	180.77	180.66	180.58	180.16	180.40	180.44	179.76	180.26	180.02	180.34	0.70

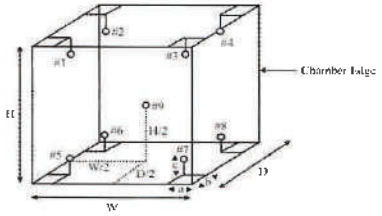
Sensor Installation Locations

Sensor No. 1 to 8

a x b x c = 5 cm x 5 cm x 5 cm

Sensor No. 9 is Referance

D / 2 x W / 2 x H / 2



Notes :

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

- End of Certificate -

Professional Calibration & Services Co., Ltd.
50/888, 50/889 Moo 2, Rungsit-Nakornnayok Rd., Bungyeetho, Thunyaburi,
Pathumthani 12130 Thailand
Tel : (+66)2150-6641 (Autoline)
Email : info@p-cal.com www.p-cal.com

Certificate of Calibration

Certificate Number	:	EL37562/25
Control Number	:	PCAL149789
Customer Control	:	SM-HT-01
Description	:	Thermal Environment Monitor
Manufacturer	:	Quest Technologies
Model	:	QUESTemp 32
Serial Number	:	TPF080087
Customer	:	Smart Environmental Consultants Co.,Ltd
		เลขที่ 225/6 หมู่ 3 ต.บ้านฉาง อ.เมืองปทุมธานี จ.ปทุมธานี 12000

Date of Receipt	:	05-Jul-25
Date of Calibration	:	07-Jul-25
Calibration Location	:	Electrical Laboratory
Environment	:	Temperature 23 °C ± 2 °C
	:	Relative Humidity 50 % ± 20 %
Calibration Method	:	Calibration Procedure Number CP-EL21
Calibration Results	:	See data attached

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

This certificate is issued in accordance with ISO/IEC17025 and the conditions of accreditation granted by the Accreditation Body which has assessed the measurement capability of the laboratory and its traceability to recognized national standards and to the units of measurement realized at the corresponding national standards laboratory.The results relate only to the item calibrated.

This certificate shall not be reproduced other than in full except without the prior written approval of the Head of Calibration Laboratory of Professional Calibration & Services Co., Ltd.

Calibrated By	Authorized Signature	
Mr. Weerapat Khoeromklang	(Mr. Jumnong Junphiong)	08-Jul-25
		Issued Date

Professional Calibration & Services Co., Ltd.
50/888, 50/889 Moo 2, Rungsit-Nakornnayok Rd., Bungyeetho, Thunyaburi,
Pathumthani 12130 Thailand
Tel : (+66)2150-6641 (Autoline)
Email : info@p-cal.com www.p-cal.com

Calibration Report

Equipment Standards Used

Description	Serial No.	Traceability to	Certificate No.	Cal. Due Date
Multimeter	US36044660	ANAB : AC-2590	EL59230/24	21-Nov-25
Platinum Resistance Thermometer	1036223	ANAB : AC-2590	EL30626/25	13-Jun-26
Hygrolog	61624608	ANAB : AC-2590,NSC : Calibration 0268	EL16393/25, SG-H-00351/68	14-Mar-26

Condition as received : Normal

Definitions :-

* ANAB - The ANSI National Accreditation Board
* NSC - National Standardization Council of Thailand

Professional Calibration & Services Co., Ltd.
50/888, 50/889 Moo 2, Rungsit-Nakornnayok Rd., Bungyeetho, Thunyaburi,
Pathumthani 12130 Thailand
Tel : (+66)2150-6641 (Autoline)
Email : info@p-cal.com www.p-cal.com

ilac-MRA ANAB ACCREDITED CALIBRATION AND DIMENSIONAL MEASUREMENT AC-2590

Calibration Report

Certificate No.: EL37562/25

Calibration Results

Temperature Calibration @ Globe

Calibration Point	Standard Value	UUC Reading	UUC Error	Uncertainty (±)
20 °C	20.02 °C	20.3 °C	0.28 °C	0.34 °C
30 °C	30.03 °C	30.3 °C	0.27 °C	0.34 °C
40 °C	40.05 °C	40.4 °C	0.35 °C	0.34 °C
50 °C	50.05 °C	50.4 °C	0.35 °C	0.34 °C

Humidity Calibration @ Reference Temperature : 25 °C

Calibration Point	Standard Value	UUC Reading	UUC Error	Uncertainty (±)
40 %RH	40.05 %RH	41 %RH	0.95 %RH	2.1 %RH
50 %RH	50.05 %RH	51 %RH	0.95 %RH	1.7 %RH
60 %RH	60.07 %RH	61 %RH	0.93 %RH	1.7 %RH
70 %RH	70.08 %RH	72 %RH	1.92 %RH	1.9 %RH

...End...

SMART TECH CALIBRATION & SERVICES CO., LTD.
14/506 MOO 3, RANGSIT-NAKHON NAYOK ROAD, LAM PHAK KUT,
THANYABURI, PATHUM THANI 12110, THAILAND
Tel +662-114-3148 Email : stcal.md@gmail.com Website : stc-cal.com

ilac-MRA ANAB ACCREDITED CALIBRATION LABORATORY AC-3093

Certificate of Calibration

Certificate No. STCR-2502128-2
Work Order No. STCR-2502126

Customer Name	:	Stack Consulting Co., Ltd. 14/3504-3505 Moo 14, Soi Pailin, T. Bang Bua Thong, A. Bang Bua Thong, Nonthaburi 11110
Equipment Name	:	Heat Stress Monitor
Manufacturer	:	QUEST
Model	:	QUESTemp° 34
Serial Number	:	TEG030096
Control Number	:	Stack#H-05
Received Date	:	Feb 28, 2025
Calibration Date	:	Mar 3, 2025
Recommended Due Date	:	Mar 3, 2026
Calibration Method	:	Calibration Procedure No. CPT-04-11
Environmental Conditions		
Ambient Temperature	:	(25 ± 2) °C
Ambient Relative Humidity	:	(50 ± 15) %RH
Calibration Place	:	Permanent Calibration Laboratory
Condition as received	:	Normal
Calibration Result	:	See data attached

1. The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor k = 2, providing a level of confidence of approximately 95%.
2. The Unit Under Calibration (UUC) has been calibrated by using the working standard which is traceable to SI-Units. The calibration procedure documented is intended to implement the requirements of ISO/IEC 17025 : 2017
3. The working standard is indicated in page 2 of this certificate.
4. This report applies to the item calibrated and shall not be reproduced except in full, without written approval by Calibration Laboratory, Smart Tech Calibration & Services Co., Ltd.
5. This results of this report only to the items calibrated.

Date of Issue : Mar 4, 2025
Calibrated by : M. Teaw

Approved by :
(Mr.Cheyut Wongleang)
Laboratory Manager

@smarttechcal

Calibration Report

Smart Tech Calibration & Services Co., Ltd.

Standards Equipment Used

Equipment Name	Serial No.	Certificate No.	Due Date	Traceability to
Thermometer Standard Readout	250220030008	TMU2403544	Sep 4, 2025	NA
Secondary Reference PRT	04794	TMU2403544	Sep 4, 2025	NA
Temperature and Humidity Standard	LA-00002148	5523631031401958	Nov 25, 2025	MP-TH

Traceability

This calibration is traceable to the International System of Unit via :

- NA : NA Caltechnologies Co., Ltd.
- MP-TH : Micro Precision Calibration Laboratory (Thailand) Co., Ltd.

Calibration Report

Smart Tech Calibration & Services Co., Ltd.

Results of Calibration

1. Temperature measurement (WET : Wet bulb)

STD Reading (°C)	UUC Reading (°C)	Correction (°C)	Uncertainty (±°C)
20.013	20.0	0.013	0.16
30.016	30.0	0.016	0.16
40.000	39.9	0.100	0.16
50.001	49.9	0.101	0.16

2. Temperature measurement (DRY : Dry bulb)

STD Reading (°C)	UUC Reading (°C)	Correction (°C)	Uncertainty (±°C)
20.018	20.0	0.018	0.16
30.013	30.0	0.013	0.16
40.000	40.0	0.000	0.16
50.009	50.0	0.009	0.16

3. Temperature measurement (GLOBE)

STD Reading (°C)	UUC Reading (°C)	Correction (°C)	Uncertainty (±°C)
20.019	20.0	0.019	0.16
30.013	29.9	0.113	0.16
40.023	39.9	0.123	0.16
50.010	49.9	0.110	0.16

4. Humidity measurement (RH)

STD Reading (%RH)	UUC Reading (%RH)	Correction (%RH)	Uncertainty (±%RH)
39.91	40	-0.09	1.6
50.00	50	0.00	1.7
59.87	60	-0.13	1.7
69.73	69	0.73	1.8

STD = Standard

UUC = Unit Under Calibration

- End of Certificate -

SMART TECH CALIBRATION & SERVICES CO., LTD.
14/506 MOO 3, RANGSIT-NAKHON NAYOK ROAD, LAM PHAK KUT,
THANYABURI, PATHUM THANI 12110, THAILAND
Tel. +662-114-3148 Email : sical.md@gmail.com Website : stc-cal.com

ilac-MRA

ANAB
ANSI National Accreditation Board
ACCREDITED
CALIBRATION LABORATORY
AC-3093

Certificate of Calibration

Certificate No. STCR-2502128-3
Work Order No. STCR-2502128

Customer Name	:	Stack Consulting Co., Ltd. 14/3504-3505 Moo. 14, Soi Pailin, T. Bang Bua Thong, A. Bang Bua Thong, Nonthaburi 11110
Equipment Name	:	Heat Stress Monitor
Manufacturer	:	QUEST
Model	:	QUESTemp° 34
Serial Number	:	TEG030010
Control Number	:	Stack#H-06
Received Data	:	Feb 28, 2025
Calibration Date	:	Mar 3, 2025
Recommended Due Date	:	Mar 3, 2026
Calibration Method	:	Calibration Procedure No. CPT-04-11

Environmental Conditions

Ambient Temperature	:	(25 ± 2) °C
Ambient Relative Humidity	:	(50 ± 15) %RH
Calibration Place	:	Permanent Calibration Laboratory

Condition as received	:	Normal
Calibration Result	:	See data attached

1. The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor $k = 2$, providing a level of confidence of approximately 95%.
2. The Unit Under Calibration (UUC) has been calibrated by using the working standard which is traceable to SI-Units. The calibration procedure documented is intended to implement the requirements of ISO/IEC 17025 : 2017
3. The working standard is indicated in page 2 of this certificate.
4. This report applies to the item calibrated and shall not be reproduced except in full, without written approval by Calibration Laboratory, Smart Tech Calibration & Services Co., Ltd
5. This results of this report only to the items calibrated.

Date of Issue : Mar 4, 2025
Calibrated by : M. Teaw

Approved by :
(Mr.Chayut Wongleang)
Laboratory Manager

@smarttechcal

Calibration Report

Smart Tech Calibration & Services Co., Ltd.

Certificate No.: STCR-2502128-3

Standards Equipment Used

Equipment Name	Serial No.	Certificate No.	Due Date	Traceability to
Thermometer Standard Readout	250220030008	TMU2403544	Sep 4, 2025	NA
Secondary Reference PRT	04794	TMU2403544	Sep 4, 2025	NA
Temperature and Humidity Standard	LA-00002148	5523631031401958	Nov 25, 2025	MP-TH

Traceability

This calibration is traceable to the International System of Unit via ;

- NA : NA Caltechnologies Co., Ltd.
- MP-TH : Micro Precision Calibration Laboratory (Thailand) Co., Ltd.

STC
TM

Calibration Report

Smart Tech Calibration & Services Co., Ltd.

Certificate No.: STCR-2502128-3

Results of Calibration

1. Temperature measurement (WET : Wet bulb)

STD Reading (°C)	UUC Reading (°C)	Correction (°C)	Uncertainty (±°C)
20.013	19.9	0.113	0.16
30.023	29.9	0.123	0.16
40.019	39.9	0.119	0.16
50.012	49.9	0.112	0.16

2. Temperature measurement (DRY : Dry bulb)

STD Reading (°C)	UUC Reading (°C)	Correction (°C)	Uncertainty (±°C)
20.013	19.9	0.113	0.16
30.018	29.9	0.118	0.16
40.022	39.9	0.122	0.16
50.018	49.8	0.218	0.16

3. Temperature measurement (GLOBE)

STD Reading (°C)	UUC Reading (°C)	Correction (°C)	Uncertainty (±°C)
20.012	19.9	0.112	0.16
30.017	29.9	0.117	0.16
40.013	39.9	0.113	0.16
50.014	49.9	0.114	0.16

4. Humidity measurement (RH)

STD Reading (%RH)	UUC Reading (%RH)	Correction (%RH)	Uncertainty (±%RH)
39.91	41	-1.09	1.6
49.70	52	-2.30	1.7
59.87	62	-2.13	1.7
69.73	71	-1.27	1.8

STD = Standard

UUC = Unit Under Calibration

- End of Certificate -

STC TM

Smart Envir
Smart Environmental Consultants Co.,Ltd.

บริษัท สมาร์ท เอ็นไวรอนเมนทอล คอนซัลแตนท์ จำกัด
225/6 หมู่ที่ 3 ตำบลบ้านฉาง อำเภอเมืองปทุมธานี จังหวัดปทุมธานี 12000
โทร : 02-117-0044 , 099-509-6465 E-mail : info.smartenvir@gmail.com

Sound Level Meter Calibration Report

Equipment Type	:	Sound Level Calibrator
Manufacturer	:	Hangzhon
Model	:	AWA6221A
Serial No.	:	AWA6221A0467E
Sound Output (dB(A))	:	114.1
Calibration date	:	16 กันยายน พ.ศ. 2568
Customer Name	:	บริษัท ปัญจพล พัลพ์ อินดัสตรี้ จำกัด (มหาชน)

No.	Sound Level Meter	Serial Number	Actual Reading (dB(A))		Status
			Before	After	
1	Scarlet Model ST-21D	820776	113.9	114.1	Pass
2	Scarlet Model ST-21D	820778	113.7	114.1	Pass
3	Scarlet Model ST-21D	820780	113.8	114.1	Pass
4	Scarlet Model ST-21D	821001	113.9	114.1	Pass
5	RION Model NL-21	00954622	113.8	114.1	Pass
6	RION Model NL-21	00709472	113.6	114.1	Pass
7	RION Model NL-21	00843641	113.6	114.1	Pass
8	RION Model NL-21	00241338	114.1	114.1	Pass

Smart Envir
Smart Environmental Consultants Co.,Ltd.
Laboratory Registered No. 1-354

Pakawat

(Mr.Pakawat Pratoomchat)
Environmental Scientist

T. Atirat

(Mr.Atirat Thaipradit)
Environmental Monitoring Manager

Professional Calibration & Services Co., Ltd.
50/888, 50/889 Moo 2, Rungsit-Nakornnayok Rd., Bungyeetho, Thunyaburi,
Pathumthani 12130 Thailand
Tel : (+66)2150-6641 (Autoline)
Email : info@p-cal.com www.p-cal.com

Certificate of Calibration

Certificate Number	: EL33798/25
Control Number	: PCAL150226
Customer Control	: SM-SC-01
Description	: Sound Calibrator
Manufacturer	: Hangzhon
Model	: AWA6221A
Serial Number	: AWA6221A0467E
Customer	: Smart Environmental Consultants Co.,Ltd
	เลขที่ 225/6 หมู่ 3 ต.บ้านฉาง อ.เมืองปทุมธานี จ.ปทุมธานี 12000
Date of Receipt	: 16-Jun-25
Date of Calibration	: 17-Jun-25
Calibration Location	: Electrical Laboratory
Environment	: Temperature 23 °C ± 2 °C
	: Relative Humidity 50 % ± 20 %
Calibration Method	: Calibration Procedure Number CP-EL35
Calibration Results	: See data attached

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

This certificate is issued in accordance with ISO/IEC17025 and the conditions of accreditation granted by the Accreditation Body which has assessed the measurement capability of the laboratory and its traceability to recognized national standards and to the units of measurement realized at the corresponding national standards laboratory.The results relate only to the item calibrated.

This certificate shall not be reproduced other than in full except without the prior written approval of the Head of Calibration Laboratory of Professional Calibration & Services Co., Ltd.

Calibrated By *Authorized Signature*

Mr.Wanutthapong Rungreang *(Mr. Jumnong Junphiong)* *19-Jun-25*

Issued Date

Professional Calibration & Services Co., Ltd.
50/888, 50/889 Moo 2, Rungsit-Nakornnayok Rd., Bungyeetho, Thunyaburi,
Pathumthani 12130 Thailand
Tel : (+66)2150-6641 (Autoline)
Email : info@p-cal.com www.p-cal.com

Calibration Report

Equipment Standards Used

Description	Serial No.	Traceability to	Certificate No.	Cal. Due Date
Sound Level Meter	030606101	ANAB : AC-2590	EL11791/25	11-Mar-26
Sound Calibrator	125626778	NSC : Calibration 0037	EEL.BP. 99/0168	23-Jan-26

Condition as received : Normal

Definitions :-

* ANAB - The ANSI National Accreditation Board
* NSC - National Standardization Council of Thailand

Professional Calibration & Services Co., Ltd.
50/888, 50/889 Moo 2, Rungsit-Nakornnayok Rd., Bungyeetho, Thunyaburi,
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Email : info@p-cal.com www.p-cal.com

Calibration Report

Certificate No.: EL33798/25

Calibration Results

Sound Pressure Level Accuracy

Nominal Value	Measured Value	UUC Error	Uncertainty (±)	Tolerance Limit Value
94 dB	93.87 dB	0.13 dB	0.17 dB	93.70 ~ 94.30 dB
114 dB	114.10 dB	-0.10 dB	0.17 dB	113.70 ~ 114.30 dB

Notes:

1). Tolerances or specifications report in table above are based on the product data sheet Sound Level Calibrator AWA6221A.

...End...

SCARLET | TECH

TAF Calibration Laboratory 3519

CERTIFICATE OF CALIBRATION

NO. 20250407127

Name of Product:	Sound Level Meter
Model:	ST-21D
Serial Number:	820776
Specification:	Class 2
Conclusion:	Pass
Date of calibration:	2025-04-07
Due Date:	2026-04-06

Calibrated by: Jim Lin

SCARLET TECH CO., LTD. 思達科技有限公司

I. This report certifies that all calibration equipment used in the test is traceable with the internal ISO9001 procedures and meets all specification given in the Manual(s) or respectively surpass then, and applies only to the unit identified above.
II. This certificate is produced with advanced equipment & procedures which permit comprehensive quality assurance verification of all data supplied herein.
III. This certificate of calibration shall not be reproduced except in full, without written permission of the Scarlet Tech Co Ltd Taiwan.

1. Preliminary inspection： OK
2. Type & serial No. of Microphone： AWA14421A-000622
3. Adjustments to indicated sound levels：

Type of Calibrator B&K 4231

Sound Pressure Level 94.0 dB

4. Measuring up limit： 138 dBA
5. Frequency weightings (Acoustic signal tests for Z weighting, other electric signal tests.)

Equivalent Free-field Sound Level (reference environment conditions) 93.8 dB

Nominal frequency /Hz	Frequency weighting / dB			Nominal frequency /Hz	Frequency weighting / dB		
	A	C	Z		A	C	Z
20	-50.4	-6.3	-0.2	1000	0.0	0.0	0.0
31.5	-39.6	-3.1	0.2	2000	1.3	-0.2	0.0
63	-26.2	-0.9	-0.1	4000	1.2	-0.6	0.0
125	-16.2	-0.3	-0.1	8000	-1.2	-3.2	0.0
250	-8.7	-0.1	0.0	12500	-11.1	-13.1	0.0
500	-3.3	0.0	0.0	/	/	/	/

6. Self-generated noise

Microphone replaced by electrical input signal device

24.6 dB(A)	27.4 dB(C)	36.2 dB(Z)

7. F&S Weighting

Rate of the F weighting decrease（dB/s）	34.5
Rate of the S weighting decrease（dB/s）	4.3
Deviation of F&S	-0.1

8. Level Linearity (A-weighting at frequency 1 kHz)

Reference sound level 90.0 dB

Max error at 10dB steps upper reference sound level 0.1 dB

Max error at 1dB steps within 5dB of the upper limit linear operating range 0.0 dB

Max error at 10dB steps below reference sound level 0.1 dB

Max error at 1dB steps within 5dB upper the lower limit linear operating range 0.1 dB

9. Tone burst response（A Weighting）:

Single Toneburst duration /ms	Toneburst response /dB			
	LAFmax-LA	LASmax-LA	LAE-LA	LAeqT-LA
500	0.0	-4.0	-2.9	-7.0
200	-1.0	-7.4	-6.9	-7.0
2	-18.2	-26.9	-26.9	-7.0
0.25	-27.1	/	-36.1	-7.0

10. Peak C sound level （500Hz）:

Cycle	One cycle	nominal value	Positive half	nominal value	Negative half	nominal value
LCpeak-LC(dB)	3.5	3.5	2.3	2.4	2.3	2.4

11. Overload indication: Pass

12. Statistical analysis function

Sweep signal maximum indicated sound level: 123.0 dB

Sweep amplitude: 40 dB

Scan cycle time: 60 S; Measurement period: 180 S.

Items	Measured value/dB	Theoretical calculated value/dB	Error/dB
LAeq,T	113.3	113.4	-0.1
L5	121.0	121.0	0.0
L10	119.0	119.0	0.0
L50	103.0	103.0	0.0
L90	87.1	87.0	0.1
L95	85.1	85.0	0.1

Uncertainty of measurement results: 0.4 dB (k=2)

Environment conditions:

Air temperature: 20 ℃

Relative humidity: 50 %

Static pressure: 101.8 kPa

Test specifications:

1. All Scarlet's Sound level Meter has been calibrated in accordance with the requirements as specified in ISO 17025 and the lab calibration procedure SMTP004-CA-152.
2. The electrical tests were performed using an electrical signal substituted for the microphone which was removed and replaced by an equivalent capacitance within a tolerance of ±20%.
3. The acoustic calibration was performed using an B&K 4226 sound calibrator and corrections was applied for the difference between the free-field and pressure responses of the Sound Level Meter.

References:

IEC 61672-3 Sound Level Meters Part 3: Periodic tests

CERTIFICATE OF CALIBRATION

NO. 20250407129

Name of Product:	Sound Level Meter
Model:	ST-21D
Serial Number:	820778
Specification:	Class 2
Conclusion:	Pass
Date of calibration:	2025-04-07
Due Date:	2026-04-06

Calibrated by: Jim Lin

I. This report certifies that all calibration equipment used in the test is traceable with the internal ISO9001 procedures and meets all specification given in the Manual(s) or respectively surpass then, and applies only to the unit identified above.
II. This certificate is produced with advanced equipment & procedures which permit comprehensive quality assurance verification of all data supplied herein.
III. This certificate of calibration shall not be reproduced except in full, without written permission of the Scarlet Tech Co Ltd Taiwan.

1. Preliminary inspection： OK

2. Type & serial No. of Microphone：AWA14421A-000691

3. Adjustments to indicated sound levels：

Type of Calibrator B&K 4231

Sound Pressure Level 94.0 dB

Equivalent Free-field Sound Level (reference environment conditions) 93.8 dB

4. Measuring up limit：138 dBA

5. Frequency weightings (Acoustic signal tests for Z weighting, other electric signal tests.)

Nominal frequency /Hz	Frequency weighting / dB			Nominal frequency /Hz	Frequency weighting / dB		
	A	C	Z		A	C	Z
20	-50.4	-6.1	-0.1	1000	0.0	0.0	0.0
31.5	-39.6	-3.0	-0.1	2000	1.3	-0.1	0.0
63	-26.2	-0.9	0.0	4000	1.3	-0.6	0.0
125	-16.2	-0.2	0.0	8000	-1.2	-3.2	0.0
250	-8.7	0.0	0.0	12500	-11.0	-13.0	0.0
500	-3.2	0.0	0.0	/	/	/	/

6. Self-generated noise

Microphone replaced by electrical input signal device

24.5 dB(A)	26.1 dB(C)	34.8 dB(Z)

7. F&S Weighting

Rate of the F weighting decrease（dB/s）	34.6
Rate of the S weighting decrease（dB/s）	4.2
Deviation of F&S	-0.1

8. Level Linearity (A-weighting at frequency 1 kHz)

Reference sound level 90.0 dB

Max error at 10dB steps upper reference sound level 0.1 dB

Max error at 1dB steps within 5dB of the upper limit linear operating range 0.0 dB

Max error at 10dB steps below reference sound level 0.1 dB

Max error at 1dB steps within 5dB upper the lower limit linear operating range 0.1 dB

9. Tone burst response（A Weighting）:

Single Toneburst duration /ms	Toneburst response /dB			
	LAFmax-LA	LASmax-LA	LAE-LA	LAeqT-LA
500	0.0	-4.0	-2.9	-7.0
200	-1.0	-7.4	-6.9	-7.0
2	-18.2	-26.9	-26.9	-7.0
0.25	-27.1	/	-36.1	-7.0

10. Peak C sound level （500Hz）:

Cycle	One cycle	nominal value	Positive half	nominal value	Negative half	nominal value
LCpeak-LC(dB)	3.5	3.5	2.3	2.4	2.3	2.4

11. Overload indication： Pass

12. Statistical analysis function

Sweep signal maximum indicated sound level: 123.0 dB

Sweep amplitude: 40 dB

Scan cycle time: 60 S; Measurement period: 180 S.

Items	Measured value/dB	Theoretical calculated value/dB	Error/dB
LAeq,T	113.3	113.4	-0.1
L5	121.0	121.0	0.0
L10	119.0	119.0	0.0
L50	103.0	103.0	0.0
L90	87.1	87.0	0.1
L95	85.1	85.0	0.1

Uncertainty of measurement results: 0.4 dB (k=2)

Environment conditions :

Air temperature: 20 ℃

Relative humidity: 50 %

Static pressure: 101.8 kPa

Test specifications:

1. All Scarlet's Sound level Meter has been calibrated in accordance with the requirements as specified in ISO 17025 and the lab calibration procedure SMTP004-CA-152.
2. The electrical tests were performed using an electrical signal substituted for the microphone which was removed and replaced by an equivalent capacitance within a tolerance of ±20%.
3. The acoustic calibration was performed using an B&K 4226 sound calibrator and corrections was applied for the difference between the free-field and pressure responses of the Sound Level Meter.

References:

IEC 61672-3 Sound Level Meters Part 3: Periodic tests

SCARLET | TECH

TAF Calibration Laboratory 3519

CERTIFICATE OF CALIBRATION

NO. 20250407131

Name of Product:	Sound Level Meter
Model:	ST-21D
Serial Number:	820780
Specification:	Class 2
Conclusion:	Pass
Date of calibration:	2025-04-07
Due Date:	2026-04-06

Calibrated by: Jim Lin

SCARLET TECH CO., LTD. SCARLET | TECH 衡鑫科技有限公司

I. This report certifies that all calibration equipment used in the test is traceable with the internal ISO9001 procedures and meets all specification given in the Manual(s) or respectively surpass then, and applies only to the unit identified above.
II. This certificate is produced with advanced equipment & procedures which permit comprehensive quality assurance verification of all data supplied herein.
III. This certificate of calibration shall not be reproduced except in full, without written permission of the Scarlet Tech Co Ltd Taiwan.

1. Preliminary inspection: OK
2. Type & serial No. of Microphone: AWA14421A-000620
3. Adjustments to indicated sound levels:

   Type of Calibrator B&K 4231

   Sound Pressure Level 94.0 dB
4. Measuring up limit: 138 dBA
5. Frequency weightings (Acoustic signal tests for Z weighting, other electric signal tests.)

Equivalent Free-field Sound Level (reference environment conditions) 93.8 dB

Nominal frequency /Hz	Frequency weighting / dB			Nominal frequency /Hz	Frequency weighting / dB		
	A	C	Z		A	C	Z
20	-50.3	-6.4	-0.2	1000	0.0	0.0	0.0
31.5	-39.5	-3.0	0.0	2000	1.3	-0.1	0.0
63	-26.2	-0.8	0.0	4000	1.3	-0.6	0.0
125	-16.1	-0.2	0.0	8000	-1.2	-3.2	0.0
250	-8.7	0.0	0.0	12500	-11.0	-13.0	0.0
500	-3.2	0.0	0.0	/	/	/	/

6. Self-generated noise

Microphone replaced by electrical input signal device

24.4 dB(A)	26.9 dB(C)	36.1 dB(Z)

7. F&S Weighting

Rate of the F weighting decrease（dB/s）	34.6
Rate of the S weighting decrease（dB/s）	4.3
Deviation of F&S	-0.1

8. Level Linearity (A-weighting at frequency 1 kHz)

Reference sound level 90.0 dB

Max error at 10dB steps upper reference sound level 0.1 dB

Max error at 1dB steps within 5dB of the upper limit linear operating range 0.0 dB

Max error at 10dB steps below reference sound level 0.1 dB

Max error at 1dB steps within 5dB upper the lower limit linear operating range 0.1 dB

9. Tone burst response（A Weighting）:

Single Toneburst duration /ms	Toneburst response /dB			
	LAFmax-LA	LASmax-LA	LAE-LA	LAeqT-LA
500	0.0	-4.0	-2.9	-7.0
200	-1.0	-7.4	-6.9	-7.0
2	-18.2	-26.9	-26.9	-7.0
0.25	-27.1	/	-36.1	-7.0

10. Peak C sound level （500Hz）:

Cycle	One cycle	nominal value	Positive half	nominal value	Negative half	nominal value
LCpeak-LC(dB)	3.5	3.5	2.3	2.4	2.3	2.4

11. Overload indication: Pass

12. Statistical analysis function

Sweep signal maximum indicated sound level: 123.0 dB

Sweep amplitude: 40 dB

Scan cycle time: 60 S; Measurement period: 180 S.

Items	Measured value/dB	Theoretical calculated value/dB	Error/dB
LAeq,T	113.3	113.4	-0.1
L5	121.0	121.0	0.0
L10	119.0	119.0	0.0
L50	103.0	103.0	0.0
L90	87.1	87.0	0.1
L95	85.1	85.0	0.1

Uncertainty of measurement results: 0.4 dB (k=2)

Environment conditions:

Air temperature: 20 ℃

Relative humidity: 50 %

Static pressure: 101.8 kPa

Test specifications:

1. All Scarlet's Sound level Meter has been calibrated in accordance with the requirements as specified in ISO 17025 and the lab calibration procedure SMTP004-CA-152.
2. The electrical tests were performed using an electrical signal substituted for the microphone which was removed and replaced by an equivalent capacitance within a tolerance of ±20%.
3. The acoustic calibration was performed using an B&K 4226 sound calibrator and corrections was applied for the difference between the free-field and pressure responses of the Sound Level Meter.

References:

IEC 61672-3 Sound Level Meters Part 3: Periodic tests

CERTIFICATE OF CALIBRATION

NO. 20250407152

Name of Product:	Sound Level Meter
Model:	ST-21D
Serial Number:	821001
Specification:	Class 2
Conclusion:	Pass
Date of calibration:	2025-04-07
Due Date:	2026-04-06

Calibrated by: Jim Lin

I. This report certifies that all calibration equipment used in the test is traceable with the internal ISO9001 procedures and meets all specification given in the Manual(s) or respectively surpass then, and applies only to the unit identified above.
II. This certificate is produced with advanced equipment & procedures which permit comprehensive quality assurance verification of all data supplied herein.
III. This certificate of calibration shall not be reproduced except in full, without written permission of the Scarlet Tech Co Ltd Taiwan.

1. Preliminary inspection： OK

2. Type & serial No. of Microphone：AWA14421A-000682

3. Adjustments to indicated sound levels：

Type of Calibrator B&K 4231

Sound Pressure Level 94.0 dB

Equivalent Free-field Sound Level (reference environment conditions) 93.8 dB

4. Measuring up limit：138 dBA

5. Frequency weightings (Acoustic signal tests for Z weighting, other electric signal tests.)

Nominal frequency /Hz	Frequency weighting / dB			Nominal frequency /Hz	Frequency weighting / dB		
	A	C	Z		A	C	Z
20	-50.4	-6.1	-0.2	1000	0.0	0.0	0.0
31.5	-39.4	-3.1	0.0	2000	1.4	-0.1	0.0
63	-26.2	-0.8	0.0	4000	1.3	-0.6	0.0
125	-16.2	-0.2	0.0	8000	-1.2	-3.1	0.1
250	-8.6	0.0	0.0	12500	-11.0	-13.0	0.0
500	-3.2	0.0	0.0	/	/	/	/

6. Self-generated noise

Microphone replaced by electrical input signal device

24.6 dB(A)	26.4 dB(C)	37.0 dB(Z)

7. F&S Weighting

Rate of the F weighting decrease（dB/s）	34.5
Rate of the S weighting decrease（dB/s）	4.2
Deviation of F&S	-0.1

8. Level Linearity (A-weighting at frequency 1 kHz)

Reference sound level 90.0 dB

Max error at 10dB steps upper reference sound level 0.1 dB

Max error at 1dB steps within 5dB of the upper limit linear operating range 0.0 dB

Max error at 10dB steps below reference sound level 0.1 dB

Max error at 1dB steps within 5dB upper the lower limit linear operating range 0.1 dB

9. Tone burst response（A Weighting）:

Single Toneburst duration /ms	Toneburst response /dB			
	LAFmax-LA	LASmax-LA	LAE-LA	LAeqT-LA
500	0.0	-4.0	-2.9	-7.0
200	-1.0	-7.4	-6.9	-7.0
2	-18.2	-26.9	-26.9	-7.0
0.25	-27.1	/	-36.1	-7.0

10. Peak C sound level （500Hz）:

Cycle	One cycle	nominal value	Positive half	nominal value	Negative half	nominal value
LCpeak-LC(dB)	3.5	3.5	2.3	2.4	2.3	2.4

11. Overload indication： Pass

12. Statistical analysis function

Sweep signal maximum indicated sound level: 123.0 dB

Sweep amplitude: 40 dB

Scan cycle time: 60 S; Measurement period: 180 S.

Items	Measured value/dB	Theoretical calculated value/dB	Error/dB
LAeq,T	113.3	113.4	-0.1
L5	121.0	121.0	0.0
L10	119.0	119.0	0.0
L50	103.0	103.0	0.0
L90	87.1	87.0	0.1
L95	85.1	85.0	0.1

Uncertainty of measurement results: 0.4 dB (k=2)

Environment conditions :

Air temperature: 20 °C

Relative humidity: 50 %

Static pressure: 101.8 kPa

Test specifications:

1. All Scarlet's Sound level Meter has been calibrated in accordance with the requirements as specified in ISO 17025 and the lab calibration procedure SMTP004-CA-152.
2. The electrical tests were performed using an electrical signal substituted for the microphone which was removed and replaced by an equivalent capacitance within a tolerance of ±20%.
3. The acoustic calibration was performed using an B&K 4226 sound calibrator and corrections was applied for the difference between the free-field and pressure responses of the Sound Level Meter.

References:

IEC 61672-3 Sound Level Meters Part 3: Periodic tests

SMART TECH CALIBRATION & SERVICES CO., LTD.
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THANYABURI, PATHUM THANI 12110, THAILAND
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ilac-MRA ANAB ANSI National Accreditation Board ACCREDITED ISO/IEC 17025 CALIBRATION LABORATORY AC-3093

Certificate of Calibration

Certificate No. STCR-2502128-19
Work Order No. STCR-2502128

Customer Name	:	Stack Consulting Co., Ltd 14/3504-3505 Moo. 14, Soi Pailin, T. Bang Bua Thong, A. Bang Bua Thong, Nonthaburi 11110
Equipment Name	:	Sound Level Meter
Manufacturer	:	Rion
Model	:	NL-21
Serial Number	:	00954622
Control Number	:	Stack#N-12
Received Date	:	Feb 28, 2025
Calibration Date	:	Mar 1, 2025
Recommended Due Date	:	Mar 1, 2026
Calibration Method	:	Calibration Procedure No. CPE-04-01
Environmental Conditions		
Ambient Temperature	:	(25 ± 2) °C
Ambient Relative Humidity	:	(50 ± 15) %RH
Calibration Place	:	Permanent Calibration Laboratory
Condition as received	:	Normal
Calibration Result	:	See data attached

1. The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor k = 2, providing a level of confidence of approximately 95%.
2. The Unit Under Calibration (UUC) has been calibrated by using the working standard which is traceable to SI-Units. The calibration procedure documented is intended to implement the requirements of ISO/IEC 17025 : 2017
3. The working standard is indicated in page 2 of this certificate.
4. This report applies to the item calibrated and shall not be reproduced except in full, without written approval by Calibration Laboratory, Smart Tech Calibration & Services Co., Ltd.
5. This results of this report only to the items calibrated.

Date of Issue : Mar 5, 2025

Calibrated by : C. Jirayu

Approved by :
(Mr.Chayut Wongleang)
Laboratory Manager

@smarttechcal

Calibration Report

Smart Tech Calibration & Services Co., Ltd.

Certificate No.: STCR-2502128-19

Standards Equipment Used

Equipment Name	Serial No.	Certificate No.	Due Date	Traceability to
Sound Calibrator	N975185	5523631031354566	Nov 6, 2025	MP-TH

Traceability

This calibration is traceable to the International System of Unit via :

- **MP-TH** : Micro Precision Calibration Laboratory (Thailand) Co., Ltd.

Calibration Report

Smart Tech Calibration & Services Co., Ltd.

Certificate No.: STCR-2502128-19

UUC Range : (30 to 130) dB Resolution : 0.1 dB

Results of Calibration: [ ] Without adjustment [✓] With adjustment

Appearance and Function of Use Inspection : GOOD

Sound Level Calibration @ Frequency 1 kHz Select : A

Response times	STD. Value	UUC. Reading		Correction	(±) Uncertainty
		Before Adjustment	After Adjustment		
FAST	94.09 dB	93.5 dB	94.0 dB	0.09 dB	0.40 dB
	114.07 dB	113.3 dB	113.8 dB	0.27 dB	0.40 dB
SLOW	94.09 dB	93.5 dB	94.0 dB	0.09 dB	0.40 dB
	114.07 dB	113.2 dB	113.8 dB	0.27 dB	0.40 dB

Sound Level Calibration @ Frequency 1 kHz Select : C

Response times	STD. Value	UUC. Reading		Correction	(±) Uncertainty
		Before Adjustment	After Adjustment		
FAST	94.09 dB	13.6 dB	94.0 dB	0.09 dB	0.40 dB
	114.07 dB	113.3 dB	113.8 dB	0.27 dB	0.40 dB
SLOW	94.09 dB	13.6 dB	94.0 dB	0.09 dB	0.40 dB
	114.07 dB	113.3 dB	113.8 dB	0.27 dB	0.40 dB

STD = Standard

UUC = Unit Under Calibration

- End of Certificate -

SMART TECH CALIBRATION & SERVICES CO., LTD.
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AC-3093

Certificate of Calibration

Certificate No. STCR-2502128-16
Work Order No. STCR-2502128

Customer Name	:	Stack Consulting Co., Ltd. 14/3504-3505 Moo. 14, Soi Pailin, T. Bang Bua Thong, A. Bang Bua Thong, Nonthaburi 11110
Equipment Name	:	Sound Level Meter
Manufacturer	:	Rion
Model	:	NL-21
Serial Number	:	00709472
Control Number	:	Stack#N-08
Received Date	:	Feb 28, 2025
Calibration Date	:	Mar 1, 2025
Recommended Due Date	:	Mar 1, 2026
Calibration Method	:	Calibration Procedure No. CPE-04-01

Environmental Conditions

Ambient Temperature	:	(25 ± 2) °C
Ambient Relative Humidity	:	(50 ± 15) %RH
Calibration Place	:	Permanent Calibration Laboratory
Condition as received	:	Normal
Calibration Result	:	See data attached

1. The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor k = 2, providing a level of confidence of approximately 95%.
2. The Unit Under Calibration (UUC) has been calibrated by using the working standard which is traceable to SI-Units. The calibration procedure documented is intended to implement the requirements of ISO/IEC 17025 : 2017
3. The working standard is indicated in page 2 of this certificate.
4. This report applies to the item calibrated and shall not be reproduced except in full, without written approval by Calibration Laboratory, Smart Tech Calibration & Services Co., Ltd.
5. This results of this report only to the items calibrated.

Date of Issue : Mar 5, 2025

Calibrated by : C. Jirayu

Approved by :

(Mr. Chayut Wongkaang)
Laboratory Manager

@smarttechcal

Calibration Report

Smart Tech Calibration & Services Co., Ltd.

Certificate No.: STCR-2502128-16

Standards Equipment Used

Equipment Name	Serial No.	Certificate No.	Due Date	Traceability to
Sound Calibrator	N975185	5523631031354566	Nov 6, 2025	MP-TH

Traceability

This calibration is traceable to the International System of Unit via :

- MP-TH : Micro Precision Calibration Laboratory (Thailand) Co., Ltd.

STC TM

Calibration Report

Smart Tech Calibration & Services Co., Ltd.

Certificate No.: STCR-2502128-16

UUC Range : (30 to 130) dB Resolution : 0.1 dB

Results of Calibration: [ ] Without adjustment [✓] With adjustment

Appearance and Function of Use Inspection : GOOD

Sound Level Calibration @ Frequency 1 kHz Select : A

Response times	STD. Value	UUC. Reading		Correction	(±) Uncertainty
		Before Adjustment	After Adjustment		
FAST	94.09 dB	93.3 dB	94.0 dB	0.09 dB	0.40 dB
	114.07 dB	113.4 dB	113.8 dB	0.27 dB	0.40 dB
SLOW	94.09 dB	93.3 dB	94.0 dB	0.09 dB	0.40 dB
	114.07 dB	113.4 dB	113.8 dB	0.27 dB	0.40 dB

Sound Level Calibration @ Frequency 1 kHz Select : C

Response times	STD. Value	UUC. Reading		Correction	(±) Uncertainty
		Before Adjustment	After Adjustment		
FAST	94.09 dB	93.4 dB	94.0 dB	0.09 dB	0.40 dB
	114.07 dB	113.2 dB	113.8 dB	0.27 dB	0.40 dB
SLOW	94.09 dB	93.4 dB	94.0 dB	0.09 dB	0.40 dB
	114.07 dB	113.2 dB	113.8 dB	0.27 dB	0.40 dB

STD = Standard

UUC = Unit Under Calibration

- End of Certificate -

SMART TECH CALIBRATION & SERVICES CO., LTD.
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Certificate of Calibration

Certificate No. STCR-2502128-17
Work Order No. STCR-2502128

Customer Name	:	Stack Consulting Co., Ltd. 14/3504-3505 Moo. 14, Soi Pallin, T. Bang Bua Thong, A. Bang Bua Thong, Nonthaburi 11110
Equipment Name	:	Sound Level Meter
Manufacturer	:	Rion
Model	:	NL-21
Serial Number	:	00843641
Control Number	:	Stack#N-09
Received Date	:	Feb 28, 2025
Calibration Date	:	Mar 1, 2025
Recommended Due Date	:	Mar 1, 2026
Calibration Method	:	Calibration Procedure No. CPE-04-01
Environmental Conditions		
Ambient Temperature	:	(25 ± 2) °C
Ambient Relative Humidity	:	(50 ± 15) %RH
Calibration Place	:	Permanent Calibration Laboratory
Condition as received	:	Normal
Calibration Result	:	See data attached

1. The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor k = 2, providing a level of confidence of approximately 95%.
2. The Unit Under Calibration (UUC) has been calibrated by using the working standard which is traceable to SI-Units. The calibration procedure documented is intended to implement the requirements of ISO/IEC 17025 : 2017
3. The working standard is indicated in page 2 of this certificate.
4. This report applies to the item calibrated and shall not be reproduced except in full, without written approval by Calibration Laboratory, Smart Tech Calibration & Services Co., Ltd.
5. This results of this report only to the items calibrated.

Date of Issue : Mar 5, 2025
Calibrated by : C. Jirayu

Approved by :
(Mr.Chayut Wongleang)
Laboratory Manager

@smarttechcal

Calibration Report

Smart Tech Calibration & Services Co., Ltd.

Certificate No.: STCR-2502128-17

Standards Equipment Used

Equipment Name	Serial No.	Certificate No.	Due Date	Traceability to
Sound Calibrator	N975185	5523631031354566	Nov 6, 2025	MP-TH

Traceability

This calibration is traceable to the International System of Unit via :

- MP-TH : Micro Precision Calibration Laboratory (Thailand) Co., Ltd.

Calibration Report

Smart Tech Calibration & Services Co., Ltd.

Certificate No.: STCR-2502128-17

UUC Range : (30 to 130) dB Resolution : 0.1 dB

Results of Calibration: [ ] Without adjustment [✓] With adjustment

Appearance and Function of Use Inspection : GOOD

Sound Level Calibration @ Frequency 1 kHz Select : A

Response times	STD. Value	UUC. Reading		Correction	(±) Uncertainty
		Before Adjustment	After Adjustment		
FAST	94.09 dB	93.4 dB	94.0 dB	0.09 dB	0.40 dB
	114.07 dB	113.1 dB	113.8 dB	0.27 dB	0.40 dB
SLOW	94.09 dB	93.4 dB	94.0 dB	0.09 dB	0.40 dB
	114.07 dB	113.1 dB	113.8 dB	0.27 dB	0.40 dB

Sound Level Calibration @ Frequency 1 kHz Select : C

Response times	STD. Value	UUC. Reading		Correction	(±) Uncertainty
		Before Adjustment	After Adjustment		
FAST	94.09 dB	93.5 dB	94.1 dB	-0.01 dB	0.40 dB
	114.07 dB	113.2 dB	113.8 dB	0.27 dB	0.40 dB
SLOW	94.09 dB	93.5 dB	94.1 dB	-0.01 dB	0.40 dB
	114.07 dB	113.2 dB	113.8 dB	0.27 dB	0.40 dB

STD = Standard

UUC = Unit Under Calibration

- End of Certificate -

SMART TECH CALIBRATION & SERVICES CO., LTD.
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Certificate of Calibration

Certificate No. STCR-2502128-12
Work Order No. STCR-2502126

Customer Name	:	Stack Consulting Co , Ltd. 14/3504-3505 Moo. 14, Soi Pailin, T. Bang Bua Thong, A. Bang Bua Thong, Nonthaburi 11110
Equipment Name	:	Sound Level Meter
Manufacturer	:	Rion
Model	:	NL-22
Serial Number	:	00241338
Control Number	:	Stack#N-02
Received Date	:	Feb 28, 2025
Calibration Date	:	Mar 3, 2025
Recommended Due Date	:	Mar 3, 2026
Calibration Method	:	Calibration Procedure No. CPE-04-01
Environmental Conditions		
Ambient Temperature	:	(25 ± 2) °C
Ambient Relative Humidity	:	(50 ± 15) %RH
Calibration Place	:	Permanent Calibration Laboratory
Condition as received	:	Normal
Calibration Result	:	See data attached

1. The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor k = 2, providing a level of confidence of approximately 95%.
2. The Unit Under Calibration (UUC) has been calibrated by using the working standard which is traceable to SI-Units. The calibration procedure documented is intended to implement the requirements of ISO/IEC 17025 : 2017
3. The working standard is indicated in page 2 of this certificate.
4. This report applies to the item calibrated and shall not be reproduced except in full, without written approval by Calibration Laboratory, Smart Tech Calibration & Services Co., Ltd.
5. This results of this report only to the items calibrated.

Date of Issue : Mar 5, 2025
Calibrated by : C. Jirayu

Approved by :
(Mr. Chayut Wongleang)
Laboratory Manager

@smarttechcal

Calibration Report

Smart Tech Calibration & Services Co., Ltd.

Certificate No.: STCR-2502128-12

Standards Equipment Used

Equipment Name	Serial No.	Certificate No.	Due Date	Traceability to
Sound Calibrator	N975185	5523631031354566	Nov 6, 2025	MP-TH

Traceability

This calibration is traceable to the International System of Unit via :

- MP-TH : Micro Precision Calibration Laboratory (Thailand) Co., Ltd.

STC TM

Calibration Report

Smart Tech Calibration & Services Co., Ltd.

Certificate No.: STCR-2502128-12

UUC Range : (30 to 130) dB Resolution : 0.1 dB

Results of Calibration: [ ] Without adjustment [✓] With adjustment

Appearance and Function of Use Inspection : GOOD

Sound Level Calibration @ Frequency 1 kHz Select : A

Response times	STD. Value	UUC. Reading		Correction	(±) Uncertainty
		Before Adjustment	After Adjustment		
FAST	94.09 dB	93.4 dB	94.0 dB	0.09 dB	0.40 dB
	114.07 dB	113.0 dB	113.8 dB	0.27 dB	0.40 dB
SLOW	94.09 dB	93.3 dB	94.0 dB	0.09 dB	0.40 dB
	114.07 dB	113.1 dB	113.8 dB	0.27 dB	0.40 dB

Sound Level Calibration @ Frequency 1 kHz Select : C

Response times	STD. Value	UUC. Reading		Correction	(±) Uncertainty
		Before Adjustment	After Adjustment		
FAST	94.09 dB	93.3 dB	94.0 dB	0.09 dB	0.40 dB
	114.07 dB	113.0 dB	113.8 dB	0.27 dB	0.40 dB
SLOW	94.09 dB	93.3 dB	94.0 dB	0.09 dB	0.40 dB
	114.07 dB	113.0 dB	113.8 dB	0.27 dB	0.40 dB

STD = Standard

UUC = Unit Under Calibration

- End of Certificate -

STC TM

บริษัท ปัญจพล พัลพ์ อินดัสตรี้ จำกัด (มหาชน)

DKSH

Certificate of Calibration

Equipment : Digital Thermometer with Probe
Model : pH 150
Serial No. : 3015462
Manufacturer : EUTECH
ID No. : -

Certificate No. : C15240840
Issued Date : 03 September 2024
Job No. : WO-00040594
Page : 1 of 2
Condition : In Condition

Customer : PANJAPOL PULP INDUSTRY PUBLIC COMPANY LIMITED.
51/1 Moo 3 Homok Sub Dist Rd. Homok,
Bang Sai, Ayutthaya 13190

Environment Condition : Temperature: 30 °C ± 10 °C
Humidity: 55 %RH ± 25 %RH
Voltage: 220 VAC ± 10 %

Calibration Place : PANJAPOL PULP INDUSTRY PUBLIC COMPANY LIMITED. (Lab Waste Water)
51/1 Moo 3 Homok Sub Dist Rd. Homok,
Bang Sai, Ayutthaya 13190

Calibration By : Mr. Siwapan Srijan
Calibration Date : 02 September 2024
The Method used : In house method, CAL-WI-69, by comparison with standard thermometer
Traceability : This certificate is traceable to the International System of Unit maintained by:
Quality Reborn Co.,Ltd. (QR)

(Mr. Siwapan Srijan)
Person in charge

(Mr. Pramote Ramrong)
Authorized signatory

This certificate is issued the units of measurement according to the International System of Units (SI). It provides traceability of measurement to international or national standard or other recognized national standard laboratories.
The measurement uncertainty stated is the expanded uncertainty which is obtained from the standard uncertainty multiplied by the coverage factor (k=2) to provide a level of confidence of approximately 95%. It is determined in accordance with the Guide to Expression of Uncertainty in Measurement (GUM).
These results may be affected by deviations from specified conditions. The results relate only to the items tested, calibrated or sampled. The report shall not be reproduced except in full without approval of DKSH Technology Limited.

บริษัท ดีเคเอสเอช เทคโนโลยี จำกัด
DKSH Technology Limited
2533 ถนนสุขุมวิท แขวงบางจาก เขตพระโขนง กรุงเทพมหานคร 10260
2533 Sukhumvit Road, Bangchak, Phrakhanong, Bangkok 10260
Phone: +66 2639 7000 Email: info.calibration@dksh.com Website: www.dksh.com/scientific-thailand

DKSH

Reference standard equipment:

Equipment	Certificate no	Cal. date	Next Cal. date
Digital Thermometer with Probe	QR23-2909	01 December 2023	01 December 2024

Calibration Results:

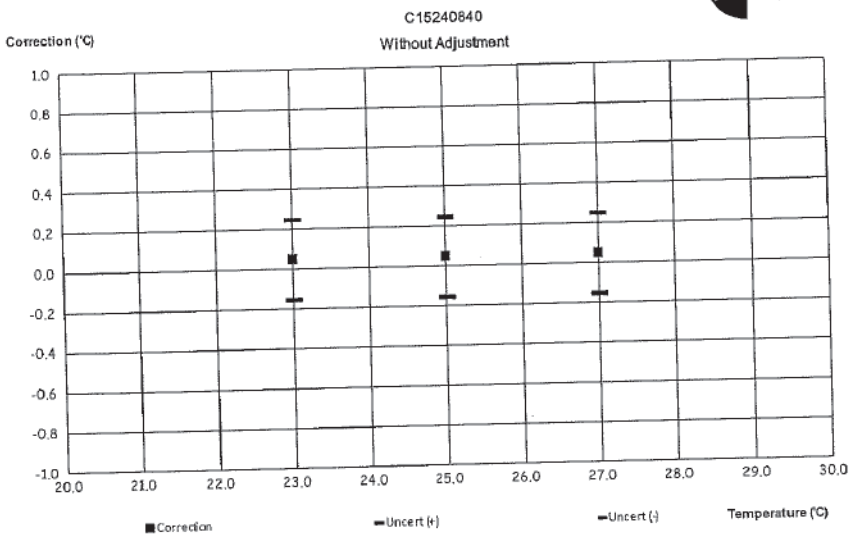
Without Adjustment

Sensor Type: RTD Electrode Serial No.: 094 Channel: -
Diameter (mm): 4 Length (mm): 1200 Immersion (mm): 110

Calibrate Point.(°C)	STD. Reading (°C)	UUC. Reading (°C)	Correction of UUC (°C)	Uncertainty (± °C)
23.0	23.049	23.0	0.049	0.20
25.0	25.048	25.0	0.048	0.20
27.0	27.049	27.0	0.049	0.20

The End of Certificate

บริษัท ดีเคเอสเอช เทคโนโลยี จำกัด
DKSH Technology Limited
2533 ถนนสุขุมวิท แขวงบางจาก เขตพระโขนง กรุงเทพมหานคร 10260
2533 Sukhumvit Road, Bangchak, Phrakhanong, Bangkok 10260
Phone: +66 2639 7000 Email: info.calibration@dksh.com Website: www.dksh.com/scientific-thailand



Delivering Growth – in Asia and Beyond.

ใบตรวจสอบสภาพเครื่องมือวัดอุณหภูมิ

Equipment : Digital Thermometer with Probe

Certificate No. : C15240840

Serial No. : 3015462

Model : pH 150

ตรวจสอบ (รับ) 2-Sep-2024 ปกติ	ไม่ปกติ	รายการตรวจเช็ค	ตรวจสอบ (ส่ง) 2-Sep-2024 ปกติ	ไม่ปกติ	หมายเหตุ
		General			
☑	☐	1. สายไฟ	☑	☐	
☐	☐	2. Adapter / Power supply 220 / 110 VAC	☐	☐	ไม่มี
☑	☐	3. การทำงาน Main Switch	☑	☐	
☑	☐	4. การทำงาน Selector Key	☑	☐	
☑	☐	5. การแสดงผล Display	☑	☐	
☑	☐	6. Battery	☑	☐	
☑	☐	7. สภาพตัวเครื่อง	☑	☐	
☑	☐	8. สภาพ Sensor (In / Ex)	☑	☐	

ข้อแนะนำ : _____

_____

_____

Mr. Siwapan Srijan

Service Engineer

บริษัท ดีเคเอสเอช เทคโนโลยี จำกัด
DKSH Technology Limited
2533 ถนนสุขุมวิท แขวงบางจาก เขตพระโขนง กรุงเทพมหานคร 10260
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Certificate of Calibration

Equipment:	pH METER	Certificate No.:	C07240435
Model:	pH 150	Issued Date:	3 September 2024
Serial No. (or ID.):	3015462	Job No.:	WO-00040594
Manufacturer:	EUTECH	Page:	1 of 3
Electrode Serial No.:	094	Model: ECFC7252201B	Brand: EUTECH
Condition:	In Condition		

Customer: PANJAPOL PULP INDUSTRY PUBLIC COMPANY LIMITED.
51/1 Moo 3 Homok Sub Dist Rd. Homok,
Bang Sai, Ayutthaya 13190

Environment Condition:

Temperature	25.4	°C	±	0.4	°C
Humidity	55.9	%RH	±	2.1	%RH

Calibration Place: PANJAPOL PULP INDUSTRY PUBLIC COMPANY LIMITED. (Lab Waste Water)
51/1 Moo 3 Homok Sub Dist Rd. Homok,
Bang Sai, Ayutthaya 13190

Calibration By: Mr.Siwapan Srijan
Calibration Date: 2 September 2024
The Method used: In house method, CAL-WI-58, base on ASTM E 70-07
Traceability: This certificate is traceable to SI Units, Sample Test is assured through primary meaurement method Harned cell, through CPAchem Ltd. (ISO/IEC 17034) Certificate No. 938377, 980704, 980707 And pH Scale traceable to the SI Units maintained by National Institute of Metrology (NIMT), Thailand through Industrial Foundation Electrical and Electronics Institute Certificate No. CA20240267EA

(Mr. Siwapan Srijan)
Person in charge

(Mr. Udon Srichana)
Authorized signatory

This certificate is issued the units of measurement according to the International System of Units (SI). It provides traceability of measurement to international or national standard or other recognized national standard laboratories.
The measurement uncertainty stated is the expanded uncertainty which is obtained from the standard uncertainty multiplied by the coverage factor (k=2) to provide a level of confidence of approximately 95%. It is determined in accordance with the Guide to Expression of Uncertainty in Measurement (GUM).
These results may be affected by deviations from specified conditions. The results relate only to the items tested, calibrated or sampled. The report shall not be reproduced except in full without approval of DKSH Technology Limited.

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Calibration Results:

pH Scale

Input	pH Meter Reading			Uncertainty of Measurement (mV)	Coverage Factor (k)
(mV)	(mV)	Error (mV)	(pH)		
414.12	414.0	-0.12	0.02	0.065	2.00
354.96	354.9	-0.06	1.02	0.065	2.00
295.80	295.8	0.00	2.02	0.065	2.00
236.64	236.6	-0.04	3.01	0.065	2.00
177.48	177.5	0.02	4.01	0.065	2.00
118.32	118.4	0.08	5.01	0.065	2.00
59.16	59.3	0.14	6.00	0.065	2.00
0	0.1	0.10	7.00	0.065	2.00
-59.16	-59.0	0.16	7.99	0.065	2.00
-118.32	-118.1	0.22	8.99	0.065	2.00
-177.48	-177.2	0.28	9.99	0.065	2.00
-236.64	-236.3	0.34	10.98	0.065	2.00
-295.80	-295.4	0.40	11.98	0.065	2.00
-354.96	-354.6	0.36	12.98	0.065	2.00
-414.12	-413.8	0.32	13.97	0.065	2.00

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Practical slope and zero point*

The three-point calibration using three standard buffer solutions; pH 4.008 , pH 6.986 and pH 9.997

-During calibration, display of pH meter reading; pH 4.01 , pH 7.00 and pH 10.01

The practical slope of the pH electrode; 57.64 (mV/pH), 97.43%

The zero point of the pH electrode; 6.99 (pH)

Sample Test Results

Standard Buffer Solution (pH)	Unit Under Calibration (pH)	Difference (pH)	Uncertainty of Measurement (pH)	Coverage Factor (k)
4.008	4.00	-0.008	0.0084	2.03
6.986	7.00	0.014	0.011	2.00
9.997	10.02	0.023	0.014	2.00

* Calibration Marked " Not TISI Accredited " in this Certificate have been included for completeness.

The End of Certificate

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ใบตรวจสอบสภาพเครื่องวัดสิ่งแวดล้อม

เลขที่ใบงาน: WO-00040594

ชนิดเครื่องมือ: pH METER รุ่น: pH 150 หมายเลขเครื่อง: 3015462

ตรวจสอบ (รับ) 02 Sep 2024 ปกติ	ตรวจสอบ (รับ) 02 Sep 2024 ไม่ปกติ	รายการตรวจเช็ค	ตรวจสอบ (ส่ง) 02 Sep 2024 ปกติ	ตรวจสอบ (ส่ง) 02 Sep 2024 ไม่ปกติ	หมายเหตุ
		General			
☑	☐	1. ความสมบูรณ์เครื่อง	☑	☐	
☑	☐	2. ความสะอาด (ช่องใส่ตัวอย่าง, ภายใน-นอกเครื่อง)	☑	☐	
☑	☐	3. สวิทช์ ปิด – เปิด เครื่อง (On-Off Swicth)	☑	☐	
☑	☐	4. ปุ่มกด (Keypad)	☑	☐	
☑	☐	5. หน้าจอ (Display, Screen Contrast)	☑	☐	
		Spectrophotometer			
☐	☐	6. แรงดันไฟฟ้า (Battery Backup) >= 2.5 VDC	☐	☐	
☐	☐	7. ตัวหมุนเลือกความยาวคลื่น (Wavelength Control)	☐	☐	
☐	☐	8. ความยาวคลื่น (Wavelength Check)	☐	☐	
☐	☐	9. แหล่งกำเนิดแสง (UV < 3,000 hour)	☐	☐	
☐	☐	10. แหล่งกำเนิดแสง (Visible < 5,000 hour)	☐	☐	
☐	☐	11. ช่องวัดหลายตัวอย่าง (Carousel Module)	☐	☐	
		pH Meter and Conductivity Meter			
☑	☐	12. อิเล็คโทรด (Electrode and Connection Cable)	☑	☐	
☐	☐	13. ระดับสารละลายใน Electrode (Level KCl)	☐	☐	
☑	☐	14. ฝาปิดกันปลาย Electrode (Dust Protection Hood)	☑	☐	
☑	☐	15. ขาจับอิเล็คโทรด (Stand)	☑	☐	
		Turbidimeter			
☐	☐	16. ค่าความขุ่นที่ต่ำสุด (No Sample)	☐	☐	
☐	☐	17. ระดับการส่องสว่างของแสง (>= 2.5 ไม่เกิน 3.0)	☐	☐	
		Automatic titrator			
☐	☐	18. สภาพ Piston Burettes	☐	☐	
☐	☐	19. Function Rinsing and Dosing	☐	☐	
☐	☐	20. ระบบท่อสายยางและอุปกรณ์ประกอบ	☐	☐	

เพิ่มเติม/ข้อแนะนำ : _____

Mr.Siwapan Srijan
Service Engineer

บริษัท ดีเคเอสเอช เทคโนโลยี จำกัด
DKSH Technology Limited
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Certificate of Calibration

NSC-TISI-TIS 17025 Calibration 0667

Equipment:	Balance	Certificate No.:	C01242823
Model:	ATX224	Issued Date:	03 September 2024
Serial No. (or ID.):	D307037776	Job No.:	WO-00040594
Manufacturer:	Shimadzu	Page:	1 of 2
Condition:	In condition		

Customer: PANJAPOL PULP INDUSTRY PUBLIC COMPANY LIMITED.
51/1 Moo 3 Homok Sub Dist Rd. Homok, Bang Sai, Ayutthaya 13190.

Environment Condition: Temperature 25 °C ± 0.7 °C
Humidity 53 %RH ± 4.6 %RH

Calibration Place: PANJAPOL PULP INDUSTRY PUBLIC COMPANY LIMITED.
(Lab Waste Water)
51/1 Moo 3 Homok Sub Dist Rd. Homok, Bang Sai, Ayutthaya 13190.

Calibration By: Mr. Preecha Phooarsai
Calibration Date: 02 September 2024
The Method used: In-house method, CAL-WI-47, based on UKAS Lab 14
Traceability: This certificate is traceable to the SI Units maintained by National Institute of Metrology (NIMT), Thailand through DKSH Technology Co., Ltd. Certificate No. C02241320

(Mr. Preecha Phooarsai)
Person in charge

(Mr. Pramote Ramrong)
Authorized signatory

This certificate is issued the units of measurement according to the International System of Units (SI). It provides traceability of measurement to international or national standard or other recognized national standard laboratories.
The measurement uncertainty stated is the expanded uncertainty which is obtained from the standard uncertainty multiplied by the coverage factor (k=2) to provide a level of confidence of approximately 95%. It is determined in accordance with the Guide to Expression of Uncertainty in Measurement (GUM).
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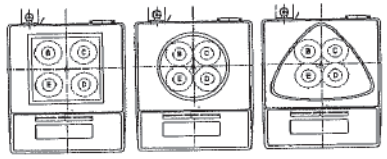
Calibration Results:

Without Adjustment

Eccentric Error: Weight to be 1/3 or 1/2 of Maximum capacity, taken from the center of the pan as a zero reference.



Nominal Test Value 100 (g)

Reference Points (g)				
A	B	C	D	E
-	0.0001	-0.0001	-0.0002	0.0001

Repeatability: Determination of the standard deviation of weighing balance., Readability 0.0001 (g)

Nominal test value (g)	Standard Deviation
20	0.00004
200	0.00007

Error of indication from nominal or conventional mass value., Readability 0.0001 (g)

Nominal Value (g)	Conventional Mass (g)	Displayed Value (g)	Error of indication (g)	Uncertainty (g)	k
0.01	0.01000	0.0100	0.0000	0.00012	2.07
0.05	0.05000	0.0500	0.0000	0.00012	2.07
0.1	0.10000	0.1000	0.0000	0.00012	2.07
0.5	0.50001	0.5000	0.0000	0.00012	2.06
1	1.00001	1.0000	0.0000	0.00012	2.06
5	5.00002	5.0000	0.0000	0.00012	2.06
10	10.00002	10.0000	0.0000	0.00012	2.06
20	20.00001	20.0000	0.0000	0.00012	2.05
50	50.00001	50.0000	0.0000	0.00014	2.03
100	99.99995	99.9999	-0.0001	0.00018	2.01
150	149.99996	149.9999	-0.0001	0.00024	2.00
200	200.00005	200.0000	0.0000	0.00030	2.00

The End of Certificate

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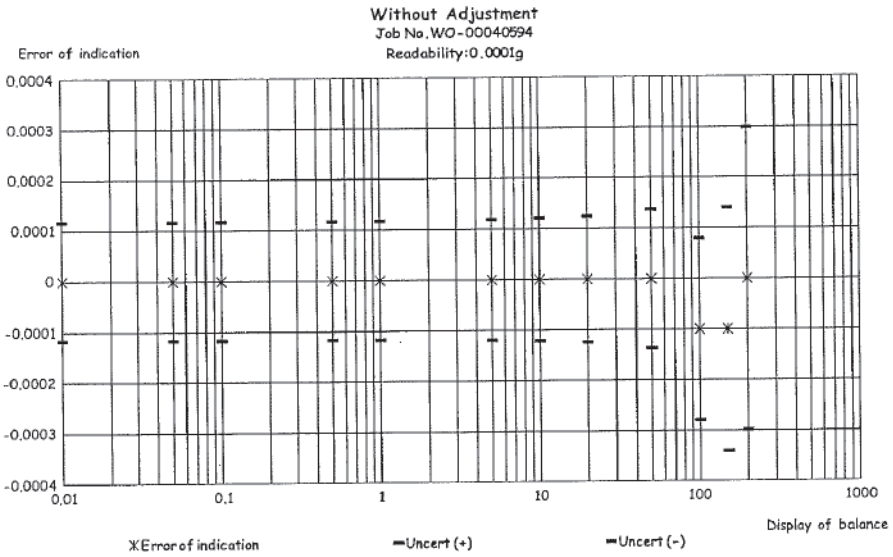

DKSH

ใบตรวจสอบสภาพเครื่องชั่ง

เลขที่ใบงาน: WO-00040594

ชนิดเครื่องมือ: Balance รุ่น: ATX224 หมายเลขเครื่อง: D307037776

ตรวจสอบ (รับ) 02 Sep 2024 ปกติ	ตรวจสอบ (รับ) 02 Sep 2024 ไม่ปกติ	รายการตรวจเช็ค	ตรวจสอบ (ส่ง) 02 Sep 2024 ปกติ	ตรวจสอบ (ส่ง) 02 Sep 2024 ไม่ปกติ	หมายเหตุ
		General			
☑	☐	1. สายไฟ/Adapter, power supply 220/110V	☑	☐	
☑	☐	2. ความสมบูรณ์ชุดกระจกกันลม (Cover)	☑	☐	
☑	☐	3. ความสมบูรณ์ชุดของระดับน้ำ	☑	☐	
☑	☐	4. การปรับระดับของขาตั้งเครื่อง	☑	☐	
☑	☐	5. การตอบสนองของปุ่มกด	☑	☐	
☑	☐	6. ความสมบูรณ์ของ Display	☑	☐	
☑	☐	7. การแสดงผลของ Display หลังวางน้ำหนัก	☑	☐	
☑	☐	8. ชุดรองจานชั่ง (Stopper) / pan support	☑	☐	
☑	☐	9. การทำงานของ Function Internal / External	☑	☐	
☑	☐	10. ความสะอาดของตัวเครื่องภายนอกและแกน load cell	☑	☐	
☑	☐	11. สภาวะแวดล้อม ณ สถานที่ตั้งเครื่อง	☑	☐	

หมายเหตุเพิ่มเติม/ข้อแนะนำ :

Mr. Preecha Phoarsai

Service Engineer

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Certificate of Calibration

Equipment:	Refrigerator	Certificate No.:	C31241798
Model:	SRR-0681A	Issued Date:	03 September 2024
Serial No.(or ID):	170100006	Job No.:	WO-00040594
Manufacturer:	Sanden Intercool	Page:	1 of 3
Condition:	In Condition	Ventilation Valve:	None
Shelves(pc.):	3		

Customer: PANJAPOL PULP INDUSTRY PUBLIC COMPANY LIMITED.
51/1 Moo 3 Homok Sub Dist Rd.
Homok, Bang Sai, Ayutthaya 13190.

Environment Condition:

Temperature:	23 °C	±	1.8	°C
Humidity:	54 %RH	±	4.1	%RH
Voltage:	222 VAC	±	0.8	VAC

Calibration Place: PANJAPOL PULP INDUSTRY PUBLIC COMPANY LIMITED.(Lab Waste Water)
51/1 Moo 3 Homok Sub Dist Rd.
Homok, Bang Sai, Ayutthaya 13190.

Calibration By: Mr. Jetsata Poonaklom
Calibration Date: 02 September 2024
The Method used: In house method, CAL-WI-16, base on TLAS-G20
Traceability: This certificate is traceable to the SI Units maintained by National Institute of Metrology (NIMT), Thailand through DKSH Technology Limited.
Certificate No. C10230022

(Mr. Jetsata Poonaklom)
Person in charge

(Mr. Udon Srichana)
Authorized signatory

This certificate is issued the units of measurement according to the International System of Units (SI). It provides traceability of measurement to international or national standard or other recognized national standard laboratories.

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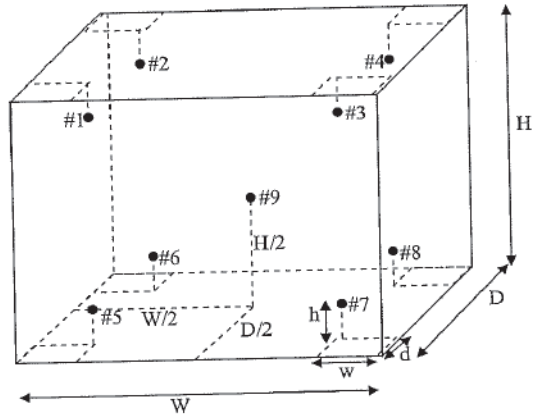

Standard Installation Locations

Volume (Calibration Zone)= 212 (Liters)

Inside chamber:	W = 57 (cm)	D = 59 (cm)	H = 140 (cm)
Standard Locations (#1, #2, #3, #4):	w = 6 (cm)	d = 6 (cm)	h = 20 (cm)
Standard Locations (#5, #6, #7, #8):	w = 6 (cm)	d = 6 (cm)	h = 20 (cm)

#9: Geometric center of the chamber

Position of Std	#1	#2	#3	#4	#5	#6	#7	#8	#9
Channel of Logger	101	102	103	104	105	106	107	108	109

Definitions

Indicating Temperature: The average reading of indicating device which forms the integral part of the enclosure.

Measured Temperature: The average reading of standards at any positions or location.

Measured Uniformity: The maximum difference of measured temperatures between of any probes and the measured temperature at the reference location which are observed at same time or at close observation time as possible to determine the temperature pattern or homogeneity with the chamber at steady-state. The reference probe is preferably located in the geometric center of the chamber.

Measured Stability: The one-half of greatest maximum difference of measured temperatures at any one probe.

Overall Variation: The difference of maximum and minimum measured temperatures throughout observation time.

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Phone: +66 2639 7000 Email: info.calibration@dksh.com Website: www.dksh.com/scientific-thailand

Calibration Results:

Without adjustment

Measurement Temperature at Spread Locations, Indicating of Unit Under Calibration: 5.0 °C

Locations	Measured Temperature (°C)	Correction of UUC. (°C)	Uncertainty (± °C)
#1	4.56	-0.44	2.8
#2	3.74	-1.26	3.2
#3	4.33	-0.67	2.7
#4	3.81	-1.19	3.1
#5	3.67	-1.33	3.2
#6	3.60	-1.40	3.3
#7	3.66	-1.34	3.0
#8	3.60	-1.40	3.2
#9	3.70	-1.30	3.2

Temperature Distribution

Desired (°C)	Setting (°C)	Indicating (°C)	Measured Temperature at Spread Locations (°C)									Uncertainty (± °C)*
			#1	#2	#3	#4	#5	#6	#7	#8	#9	
4.0	4.0	5.0	4.56	3.74	4.33	3.81	3.67	3.60	3.66	3.60	3.70	3.3

Chamber Characterization

Indicating (°C)	Measured Uniformity (°C)	Measured Stability (± °C)	Overall Variation (°C)
5.0	1.20	2.47	5.24

Note: * Maximum uncertainty of the each position

The End of Certificate

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DKSH Technology Limited
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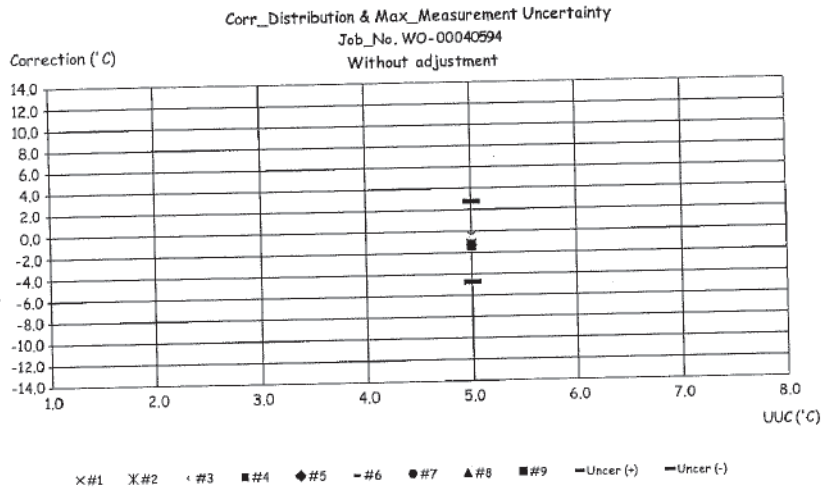
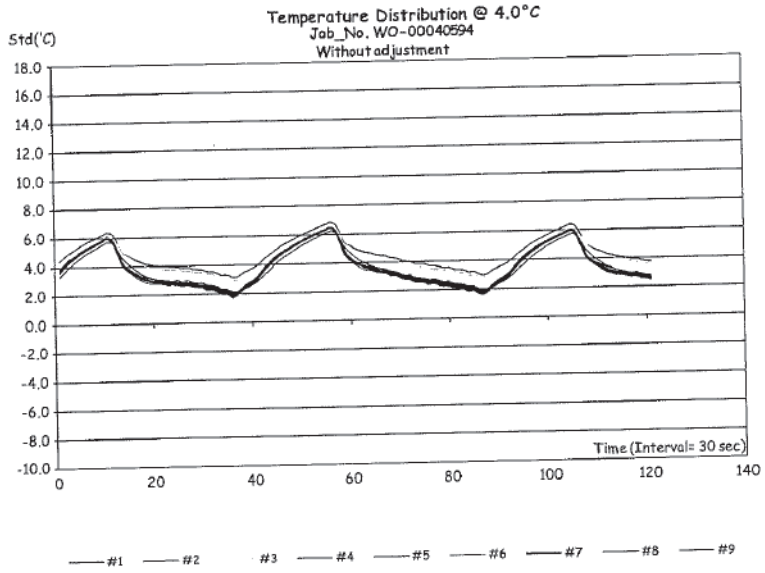
Phone: +66 2639 7000 Email: info.calibration@dksh.com Website: www.dksh.com/scientific-thailand





DKSH

ใบตรวจสอบสภาพเครื่องควบคุมอุณหภูมิ

เลขที่ใบงาน: WO-00040594

ชนิดเครื่องมือ: Refrigerator รุ่น: SRR-0681A

หมายเลขเครื่อง: 170100006

ตรวจสอบ (รับ) 02 Sep 2024 ปกติ	ตรวจสอบ (รับ) 02 Sep 2024 ไม่ปกติ	รายการตรวจเช็ค	ตรวจสอบ (ส่ง) 02 Sep 2024 ปกติ	ตรวจสอบ (ส่ง) 02 Sep 2024 ไม่ปกติ	หมายเหตุ
		General			
☑	☐	1. สายไฟ	☑	☐	
☑	☐	2. การทำงาน Main Switch	☑	☐	
☑	☐	3. การทำงาน Selector Key	☑	☐	
☑	☐	4. การแสดงผล Display	☑	☐	
☑	☐	5. การทำงาน พัดลม	☑	☐	
☑	☐	6. สภาพ Lever of Ventilation valve	☐	☐	ไม่มี
☑	☐	7. สภาพ Lever door open / close	☑	☐	
☑	☐	8. สภาพ Door seal	☑	☐	
☐	☐	9. การทำงานของระบบ Safety	☐	☐	ไม่ได้ตรวจสอบ
☑	☐	10. การทำงานของระบบทำความเย็น	☑	☐	
☐	☐	11. การทำงานของระบบทำความชื้น	☐	☐	ไม่มี
☑	☐	12. สภาพตัวเครื่อง	☑	☐	
☑	☐	13. สภาวะแวดล้อม ณ สถานที่ตั้งเครื่อง	☑	☐	

ข้อแนะนำ : _____

_____

Mr. Jetsata Poonaklom

Service Engineer

บริษัท ดีเคเอสเอช เทคโนโลยี จำกัด
DKSH Technology Limited
2533 ถนนสุขุมวิท แขวงบางจาก เขตพระโขนง กรุงเทพมหานคร 10260
2533 Sukhumvit Road, Bangchak, Phrakhanong, Bangkok 10260
Phone: +66 2639 7000 Email: info.calibration@dksh.com Website: www.dksh.com/scientific-thailand

DKSH

Certificate of Calibration

NSC-TISI-TIS 17025 Calibration 0047

Equipment:	Cooled Incubator	Certificate No.:	C31241797
Model:	TC 140 G	Issued Date:	03 September 2024
Serial No.(or ID):	0714/000024 (IN-002)	Job No.:	WO-00040594
Manufacturer:	Lovibond	Page:	1 of 3
Condition:	In Condition	Ventilation Valve:	None
Shelves(pc.):	2		

Customer: PANJAPOL PULP INDUSTRY PUBLIC COMPANY LIMITED.
51/1 Moo 3 Homok Sub Dist Rd.
Homok, Bang Sai, Ayutthaya 13190.

Environment Condition:

Temperature:	23 °C	±	1.3	°C
Humidity:	54 %RH	±	4.1	%RH
Voltage:	222 VAC	±	0.8	VAC

Calibration Place: PANJAPOL PULP INDUSTRY PUBLIC COMPANY LIMITED.(Lab Waste Water)
51/1 Moo 3 Homok Sub Dist Rd.
Homok, Bang Sai, Ayutthaya 13190.

Calibration By: Mr. Jetsata Poonaklom

Calibration Date: 02 September 2024

The Method used: In house method, CAL-WI-16, base on TLAS-G20

Traceability: This certificate is traceable to the SI Units maintained by National Institute of Metrology (NIMT), Thailand through DKSH Technology Limited.
Certificate No. C10230022

(Mr. Jetsata Poonaklom)
Person in charge

(Mr. Udon Srichana)
Authorized signatory

This certificate is issued the units of measurement according to the International System of Units (SI). It provides traceability of measurement to international or national standard or other recognized national standard laboratories.

The measurement uncertainty stated is the expanded uncertainty which is obtained from the standard uncertainty multiplied by the coverage factor (k=2) to provide a level of confidence of approximately 95%. It is determined in accordance with the Guide to Expression of Uncertainty in Measurement (GUM).

These results may be affected by deviations from specified conditions. The results relate only to the items tested, calibrated or sampled. The report shall not be reproduced except in full without approval of DKSH Technology Limited.

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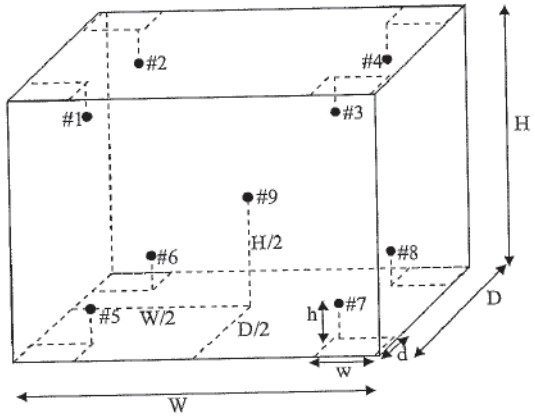

Standard Installation Locations

Volume (Calibration Zone)= 81 (Liters)

Inside chamber:	W = 55 (cm)	D = 43 (cm)	H = 71 (cm)
Standard Locations (#1, #2, #3, #4):	w = 6 (cm)	d = 5 (cm)	h = 7 (cm)
Standard Locations (#5, #6, #7, #8):	w = 6 (cm)	d = 5 (cm)	h = 7 (cm)

#9: Geometric center of the chamber

Position of Std	#1	#2	#3	#4	#5	#6	#7	#8	#9
Channel of Logger	201	202	203	204	205	206	207	208	209

Definitions

Indicating Temperature: The average reading of indicating device which forms the integral part of the enclosure.

Measured Temperature: The average reading of standards at any positions or location.

Measured Uniformity: The maximum difference of measured temperatures between of any probes and the measured temperature at the reference location which are observed at same time or at close observation time as possible to determine the temperature pattern or homogeneity with the chamber at steady-state. The reference probe is preferably located in the geometric center of the chamber.

Measured Stability: The one-half of greatest maximum difference of measured temperatures at any one probe.

Overall Variation: The difference of maximum and minimum measured temperatures throughout observation time.

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2533 Sukhumvit Road, Bangchak, Phrakhanong, Bangkok 10260
Phone: +66 2639 7000 Email: info.calibration@dksh.com Website: www.dksh.com/scientific-thailand

Calibration Results:

Without adjustment

Measurement Temperature at Spread Locations, Indicating of Unit Under Calibration: 20.2 °C

Locations	Measured Temperature (°C)	Correction of UUC. (°C)	Uncertainty (± °C)
#1	20.17	-0.03	0.50
#2	20.15	-0.05	0.51
#3	20.17	-0.03	0.51
#4	20.17	-0.03	0.51
#5	20.07	-0.13	0.53
#6	20.02	-0.18	0.58
#7	20.12	-0.08	0.54
#8	20.17	-0.03	0.54
#9	20.16	-0.04	0.53

Temperature Distribution

Desired (°C)	Setting (°C)	Indicating (°C)	Measured Temperature at Spread Locations (°C)									Uncertainty (± °C)*
			#1	#2	#3	#4	#5	#6	#7	#8	#9	
20.0	20.5	20.2	20.17	20.15	20.17	20.17	20.07	20.02	20.12	20.17	20.16	0.58

Chamber Characterization

Indicating (°C)	Measured Uniformity (°C)	Measured Stability (± °C)	Overall Variation (°C)
20.2	0.25	0.31	0.70

Note: * Maximum uncertainty of the each position

The End of Certificate

บริษัท ดีเคเอสเอช เทคโนโลยี จำกัด
DKSH Technology Limited
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Phone: +66 2639 7000 Email: info.calibration@dksh.com Website: www.dksh.com/scientific-thailand

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CAL-FM-C31-10: 12 Sep 2022

Statements of conformity:

This conformity certificate documents the validity of the following statements of conformity based on the measurement results of corresponding calibration certificate:

The correction of indication determined during calibration are under given measurement and environmental conditions and considering the expanded measurement uncertainty (coverage probability 95%) within the specification. The given measurement uncertainty already includes other all effects by according to the standard method, TLAS-G20. Therefore, those parameters have not been assessed separately.

Tolerance and Decision rules:

Assessment of the conformity of the measurement device are done based on direct comparison of the relevant measurement results with the tolerances and decision rule are prescribed by the customer.

Decision rule :

- ☐ Choice A — Binary Statement for Simple Acceptance Rule (w = 0), Specific Risk < 50% PFA.
- ☑ Choice B — Non-binary statement with guard band (w = 1 U), Pass or Fail Specific Risk < 2.5% PFA and Condition Pass or Condition Fail Specific Risk < 50% PFA.
- ☐ Choice C — Customer defined, Customers may define arbitrary multiple of r to have applied as guard band (w = r U) .

; PFA – Probability of False Accept

(Mr. Udon Srichana)
Authorized signatory

Without adjustment

Desired Temperature : 20.0°C **Tolerances : 1.0 °C**

Measurement Temperature at Spread Locations, Indicating of Unit Under Calibration: 20.2 °C

Locations	Measured (°C)	Correction* (°C)	Guard band (W) (± °C)	Tolerance (± °C)	Conformity
#1	20.17	0.17	0.50	1.0	Pass
#2	20.15	0.15	0.51	1.0	Pass
#3	20.17	0.17	0.51	1.0	Pass
#4	20.17	0.17	0.51	1.0	Pass
#5	20.07	0.07	0.53	1.0	Pass
#6	20.02	0.02	0.58	1.0	Pass
#7	20.12	0.12	0.54	1.0	Pass
#8	20.17	0.17	0.54	1.0	Pass
#9	20.16	0.16	0.53	1.0	Pass

Correction* = Measured Temperature - Desired Temperature

The validity of the statements of conformity cannot be guaranteed for different places of use, environmental conditions or improper use.

The End of Statements of Conformity

บริษัท ดีคเอสเอช เทคโนโลยี จำกัด
DKSH Technology Limited
2533 ถนนสุขุมวิท แขวงบางจาก เขตพระโขนง กรุงเทพมหานคร 10260
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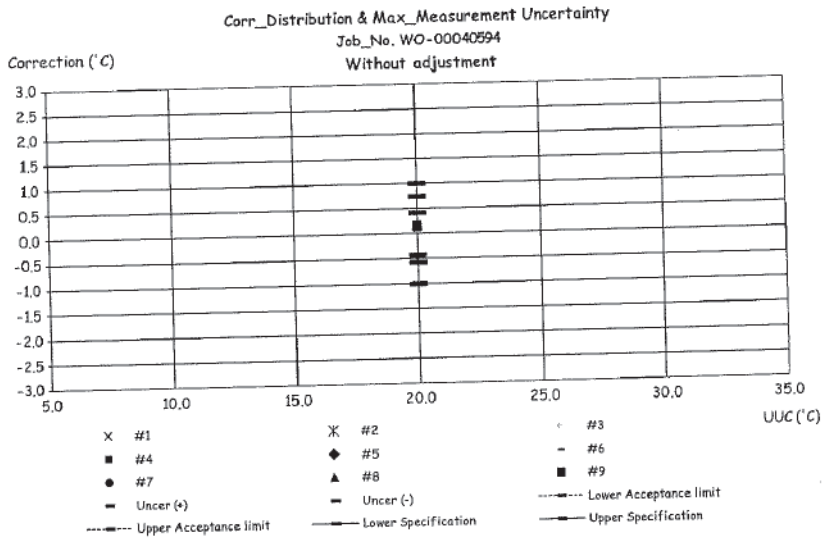

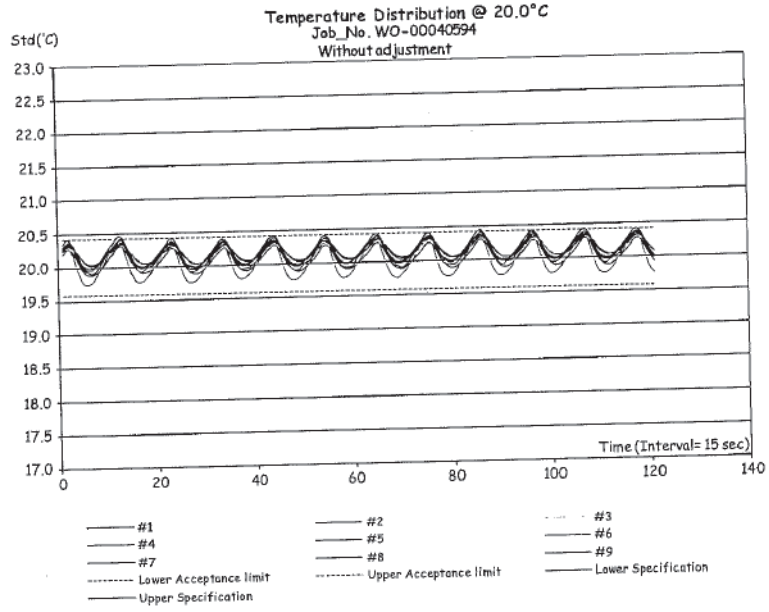

DKSH

ใบตรวจสอบสภาพเครื่องควบคุมอุณหภูมิ

เลขที่ใบงาน: WO-00040594

ชนิดเครื่องมือ: Cooled Incubator รุ่น: TC 140 G

หมายเลขเครื่อง: 0714/000024 (IN-002)

ตรวจสอบ (รับ) 02 Sep 2024 ปกติ	ตรวจสอบ (รับ) 02 Sep 2024 ไม่ปกติ	รายการตรวจเช็ค	ตรวจสอบ (ส่ง) 02 Sep 2024 ปกติ	ตรวจสอบ (ส่ง) 02 Sep 2024 ไม่ปกติ	หมายเหตุ
		General			
☑	☐	1. สายไฟ	☑	☐	
☑	☐	2. การทำงาน Main Switch	☑	☐	
☑	☐	3. การทำงาน Selector Key	☑	☐	
☑	☐	4. การแสดงผล Display	☑	☐	
☑	☐	5. การทำงาน พัดลม	☑	☐	
☐	☐	6. สภาพ Lever of Ventilation valve	☐	☐	ไม่มี
☑	☐	7. สภาพ Lever door open / close	☑	☐	
☑	☐	8. สภาพ Door seal	☑	☐	
☐	☐	9. การทำงานของระบบ Safety	☐	☐	ไม่ได้ตรวจสอบ
☑	☐	10. การทำงานของระบบทำความเย็น	☑	☐	
☐	☐	11. การทำงานของระบบทำความชื้น	☐	☐	ไม่มี
☑	☐	12. สภาพตัวเครื่อง	☑	☐	
☑	☐	13. สภาวะแวดล้อม ณ สถานที่ตั้งเครื่อง	☑	☐	

ข้อแนะนำ : _____

_____

Mr. Jetsata Poonaklom

Service Engineer

บริษัท ดีเคเอสเอช เทคโนโลยี จำกัด
DKSH Technology Limited
2533 ถนนสุขุมวิท แขวงบางจาก เขตพระโขนง กรุงเทพมหานคร 10260
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Phone: +66 2639 7000 Email: info.calibration@dksh.com Website: www.dksh.com/scientific-thailand

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HANNA instruments

Hanna Instruments (Thailand) Ltd.

410/67-68 Soi Ratchadapisek 24, Ratchadapisek Rd., Samsen-nok, Huaykwang, Bangkok 10310 Tel: 0-2541-4199 Fax: 0-2541-4198

ilac-MRA ANAB ACCREDITED CALIBRATION LABORATORY AC-3061

Certificate No. : HIT-2448-2011

CERTIFICATE OF CALIBRATION

Equipment :	COD Test Tube Heater		
Meter Model :	HI839150-02	**Serial No. :**	101450001111
Tube Heater :	25 Vial Capacity	**Resolution :**	0.1°C
Temperature Range :	(20 to 160)°C	**Temperature of Reaction :**	150°C
Manufacturer :	Hanna Instruments	**Made in :**	Romania
Condition As-Received :	New Product	**Reference :**	RE242284
Ambient Temperature :	(25 ± 2)°C	**Relative Humidity :**	(50 ± 15)% RH
Customer name :	PANJAPOL PULP INDUSTRY PUBLIC CO., LTD. 51/1 MOO 3 TAMBON HO-MOK, AMPHOE BANGSAI, AYUTTHAYA 13190		
Received date :	21 November 2024		
Calibrate date :	29 November 2024		
Issue date :	2 December 2024		
Calibrated Location :	Hanna Instruments (Thailand) Ltd.		
Calibration Procedure :	This calibrator was conducted by using in-house: calibration procedure CP-04 by using certified reference standard instruments.		

Calibrated by : ☑ Mr. Pichit Petthong

☐ Mr. Channarong Soinak

Approved by :

Mr. Anan Suwanchaisakul

Authorized Signatory

HANNA Instruments (Thailand) Limited

This certificate was certified only for the instrument we calibrated.

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

** This certificate may not be reproduced other than in full, except with the prior written ** approval of the head of Hanna Instrument (Thailand).

HANNA instruments

Certificate No. : HIT-2448-2011

Condition of this calibration result:

Reference Standard Instruments : This certification is traceable to the international unit of unit maintained through:

Instruments	Model	Serial No.	Certificate No.	Traceable
Data Acquisition Switch Unit	34970A	MY44065265	WK2407-141-1	WK Electric Co., Ltd.
Digital Thermo-Hygrometer	HT-771SD	AI.07155	24H41	Technology Promotion Association (Thailand-Japan).

Calibration Result:

Measurement Temperature Source Accuracy for COD Reactor.

Capacity (Vial)	Nominal Value (°C)	Average Value (°C)	Uncertainty of Measurement (±°C)
25 Vial	150.0	149.3	0.47

Unit : °C

(1A) 148.942	(2A) 149.316	(3A) 149.217	(4A) 149.113	(5A) 149.153
(1B) 149.244	(2B) 149.811	(3B) 149.321	(4B) 149.913	(5B) 149.308
(1C) 148.887	(2C) 149.318	(3C) 149.360	(4C) 149.323	(5C) 149.084
(1D) 149.115	(2D) 149.217	(3D) 149.595	(4D) 149.264	(5D) 148.990
(1E) 149.380	(2E) 149.587	(3E) 149.562	(4E) 149.093	(5E) 149.150

Figure: Shows the location of the temperature source.

The report uncertainty of measurement was based on a standard uncertainty multiplied by a coverage factor $k = 2$, providing a level of confidence of approximately 95%

** End of certificate **

DKSH

Certificate of Calibration

Equipment:	Hot Air Oven	Certificate No.:	C31240108
Model:	UF110	Issued Date:	16 January 2024
Serial No.(or ID):	B423.1065	Job No.:	WO-00014012
Manufacturer:	Memmert	Page:	1 of 3
Condition:	New	Ventilation Valve:	Closed
Shelves(pc.):	2		

Customer: PANJAPOL PULP INDUSTRY PUBLIC COMPANY LIMITED
51/1 Moo 3 T.Hormok, A.Bangsai,
Ayutthaya 13190 Thailand

Environment Condition:

Temperature:	25 °C	±	0.7	°C
Humidity:	45 %RH	±	4.0	%RH
Voltage:	220 VAC	±	1.2	VAC

Calibration Place: PANJAPOL PULP INDUSTRY PUBLIC COMPANY LIMITED (Lab Waste Water)
51/1 Moo 3 T.Hormok, A.Bangsai,
Ayutthaya 13190 Thailand

Calibration By: Mr. Siwapan Srijan
Calibration Date: 16 January 2024
The Method used: In house method, CAL-WI-16, base on TLAS-G20
Traceability: This certificate is traceable to the SI Units maintained by National Institute of Metrology (NIMT), Thailand through DKSH Technology Limited.
Certificate No. C10230013

(Mr. Siwapan Srijan)
Person in charge

(Mr. Udon Srichana)
Authorized signatory

This certificate is issued the units of measurement according to the International System of Units (SI). It provides traceability of measurement to international or national standard or other recognized national standard laboratories.
The measurement uncertainty stated is the expanded uncertainty which is obtained from the standard uncertainty multiplied by the coverage factor (k=2) to provide a level of confidence of approximately 95%. It is determined in accordance with the Guide to Expression of Uncertainty in Measurement (GUM).
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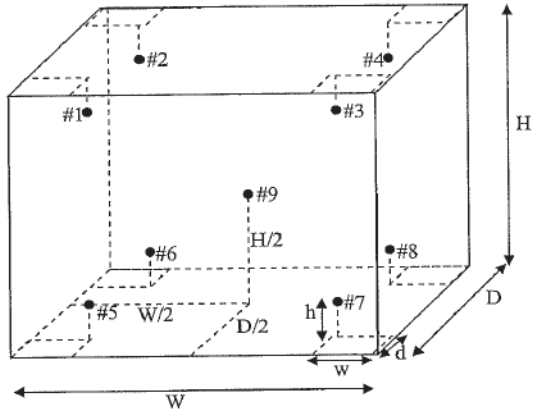

Standard Installation Locations

Volume (Calibration Zone)= 50 (Liters)

Inside chamber:	W = 56 (cm)	D = 40 (cm)	H = 48 (cm)
Standard Locations (#1, #2, #3, #4):	w = 6 (cm)	d = 5 (cm)	h = 5 (cm)
Standard Locations (#5, #6, #7, #8):	w = 6 (cm)	d = 5 (cm)	h = 5 (cm)

#9: Geometric center of the chamber

Position of Std	#1	#2	#3	#4	#5	#6	#7	#8	#9
Channel of Logger	101	102	103	104	105	106	107	108	109

Definitions

Indicating Temperature: The average reading of indicating device which forms the integral part of the enclosure.

Measured Temperature: The average reading of standards at any positions or location.

Measured Uniformity: The maximum difference of measured temperatures between of any probes and the measured temperature at the reference location which are observed at same time or at close observation time as possible to determine the temperature pattern or homogeneity with the chamber at steady-state. The reference probe is preferably located in the geometric center of the chamber.

Measured Stability: The one-half of greatest maximum difference of measured temperatures at any one probe.

Overall Variation: The difference of maximum and minimum measured temperatures throughout observation time.

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2533 Sukhumvit Road, Bangchak, Phrakhanong, Bangkok 10260
Phone: +66 2639 7000 Email: info.calibration@dksh.com Website: www.dksh.com/scientific-thailand

Calibration Results:

Without adjustment

Measurement Temperature at Spread Locations, Indicating of Unit Under Calibration: 104.0 °C

Locations	Measured Temperature (°C)	Correction of UUC. (°C)	Uncertainty (± °C)
#1	104.12	0.12	0.39
#2	103.53	-0.47	0.39
#3	104.16	0.16	0.39
#4	104.12	0.12	0.39
#5	104.51	0.51	0.39
#6	104.30	0.30	0.39
#7	103.54	-0.46	0.41
#8	103.72	-0.28	0.39
#9	104.41	0.41	0.39

Temperature Distribution

Desired (°C)	Setting (°C)	Indicating (°C)	Measured Temperature at Spread Locations (°C)									Uncertainty (± °C)*
			#1	#2	#3	#4	#5	#6	#7	#8	#9	
104.0	104.0	104.0	104.12	103.53	104.16	104.12	104.51	104.30	103.54	103.72	104.41	0.41

Chamber Characterization

Indicating (°C)	Measured Uniformity (°C)	Measured Stability (± °C)	Overall Variation (°C)
104.0	0.98	0.14	1.17

Note: * Maximum uncertainty of the each position

The End of Certificate

บริษัท ดีเคเอสเอช เทคโนโลยี จำกัด
DKSH Technology Limited
2533 ถนนสุขุมวิท แขวงบางจาก เขตพระโขนง กรุงเทพมหานคร 10260
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Phone: +66 2639 7000 Email: info.calibration@dksh.com Website: www.dksh.com/scientific-thailand

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Refer to Certificate No.: C31240108 Page: 1 of 1

Statements of conformity:

This conformity certificate documents the validity of the following statements of conformity based on the measurement results of corresponding calibration certificate:

The correction of indication determined during calibration are under given measurement and environmental conditions and considering the expanded measurement uncertainty (coverage probability 95%) within the specification. The given measurement uncertainty already includes other all effects by according to the standard method, TLAS-G20. Therefore, those parameters have not been assessed separately.

Tolerance and Decision rules:

Assessment of the conformity of the measurement device are done based on direct comparison of the relevant measurement results with the tolerances and decision rule are prescribed by the customer.

Decision rule :

- ☐ Choice A — Binary Statement for Simple Acceptance Rule (w = 0), Specific Risk < 50% PFA.
- ☑ Choice B — Non-binary statement with guard band (w = 1 U), Pass or Fail Specific Risk < 2.5% PFA and Condition Pass or Condition Fail Specific Risk < 50% PFA.
- ☐ Choice C — Customer defined, Customers may define arbitrary multiple of r to have applied as guard band (w = r U).

; PFA – Probability of False Accept

(Mr. Udon Srichana)
Authorized signatory

Without adjustment

Desired Temperature : 104.0°C Tolerances : 1.0 °C

Measurement Temperature at Spread Locations, Indicating of Unit Under Calibration: 104.0 °C

Locations	Measured (°C)	Correction* (°C)	Guard band (W) (± °C)	Tolerance (± °C)	Conformity
#1	104.12	0.12	0.39	1.0	Pass
#2	103.53	-0.47	0.39	1.0	Pass
#3	104.16	0.16	0.39	1.0	Pass
#4	104.12	0.12	0.39	1.0	Pass
#5	104.51	0.51	0.39	1.0	Pass
#6	104.30	0.30	0.39	1.0	Pass
#7	103.54	-0.46	0.41	1.0	Pass
#8	103.72	-0.28	0.39	1.0	Pass
#9	104.41	0.41	0.39	1.0	Pass

Correction* = Measured Temperature - Desired Temperature

The validity of the statements of conformity cannot be guaranteed for different places of use, environmental conditions or improper use

The End of Statements of Conformity

บริษัท ดีเคเอสเอช เทคโนโลยี จำกัด
DKSH Technology Limited
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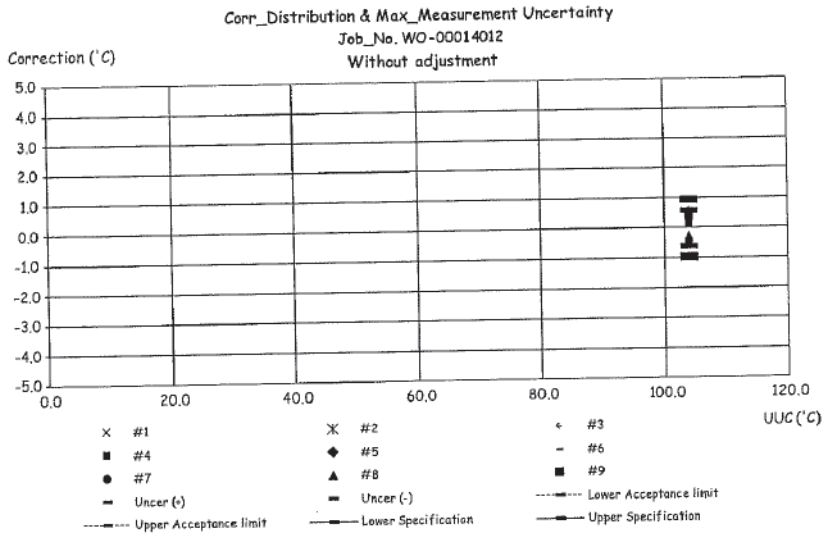

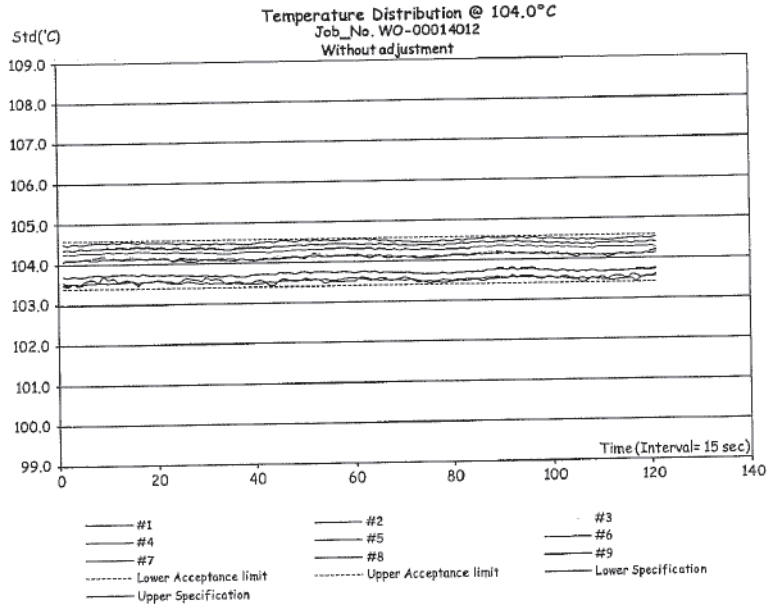

DKSH

ใบตรวจสอบสภาพเครื่องควบคุมอุณหภูมิ

เลขที่ใบงาน: WO-00014012

ชนิดเครื่องมือ: Hot Air Oven รุ่น: UF110

หมายเลขเครื่อง: B423.1065

ตรวจสอบ (รับ) 16 Jan 2024 ปกติ	ตรวจสอบ (รับ) 16 Jan 2024 ไม่ปกติ	รายการตรวจเช็ค	ตรวจสอบ (ส่ง) 16 Jan 2024 ปกติ	ตรวจสอบ (ส่ง) 16 Jan 2024 ไม่ปกติ	หมายเหตุ
		General			
☑	☐	1. สายไฟ	☑	☐	
☑	☐	2. การทำงาน Main Switch	☑	☐	
☑	☐	3. การทำงาน Selector Key	☑	☐	
☑	☐	4. การแสดงผล Display	☑	☐	
☑	☐	5. การทำงาน พัดลม	☑	☐	
☑	☐	6. สภาพ Lever of Ventilation valve	☑	☐	
☑	☐	7. สภาพ Lever door open / close	☑	☐	
☑	☐	8. สภาพ Door seal	☑	☐	
☑	☐	9. การทำงานของระบบ Safety	☑	☐	
☐	☐	10. การทำงานของระบบทำความเย็น	☐	☐	ไม่มี
☐	☐	11. การทำงานของระบบทำความชื้น	☐	☐	ไม่มี
☑	☐	12. สภาพตัวเครื่อง	☑	☐	
☑	☐	13. สภาวะแวดล้อม ณ สถานที่ตั้งเครื่อง	☑	☐	

ข้อแนะนำ : _____

_____

Mr. Siwapan Srijan

Service Engineer

บริษัท ดีเคเอสเอช เทคโนโลยี จำกัด
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