

ภาคผนวก ค

หนังสือรับรองผลการตรวจวัดและวิเคราะห์



บริษัท ซีคอต จำกัด
SECOT CO., LTD.

239 ถนนริมคลองประปา แขวงบางซื่อ เขตบางซื่อ กรุงเทพมหานคร 10800

239 RIMKLONGPRAPA ROAD, BANGSUE, BANGKOK 10800, THAILAND

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

GROUND WATER ANALYSIS REPORT

CLIENT NAME	: Kuwait Petroleum Aviation (Thailand) Ltd.	REQUEST SERVICE No.	: 1825/65
	(Feeder Line Project)	SAMPLING METHOD	: Pneumatic Bladder Pump
SAMPLING BY	: SECOT Co., Ltd.	SAMPLING TIME	: 13:48-13:56
SAMPLING DATE	: 06/09/2022	ANALYTICAL DATE	: 06, 08-15/09/2022
RECEIVED DATE	: 08/09/2022	SITE OPERATOR	: Mr. Baworn Deechaiya
REPORT DATE	: 21/09/2022	FILE CODE	: 222100_GW_September
SAMPLE CONDITION	: Normal		

PARAMETER	UNIT	ANALYSIS	ND	STATION
		METHODS	(non-detectable)	MW-2
Depth	m	-	-	4.06
Temperature	°C	2550 B	< 0.5	31.7
pH	-	4500-H ⁺ B	< 0.10	3.84
Color	Unit	2120 B	< 5.0	5
Conductivity	µS/cm	2510 B	< 1.0	3,295
Total Dissolved Solids	mg/l	2540 C	< 50	2,414
Total Suspended Solids	mg/l	2540 D	< 5	11

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

(Miss Khemchuda Insorn)

Analyst

(Mrs. Araya Tipparuk)

Technical Management Team

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

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3. - Not available.



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SAMPLE CONDITION	: Normal		

PARAMETER	UNIT	ANALYSIS METHODS	ND (non-detectable)	STATION	STANDARD ^{1/}
				MW-2	
Benzene	mg/l	6200 B	< 0.0002	ND	≤ 0.2
Carbon tetrachloride	mg/l	6200 B	< 0.0002	ND	≤ 0.4
1,2-Dichloroethane	mg/l	6200 B	< 0.0002	ND	≤ 0.5
Dichloromethane	mg/l	6200 B	< 0.0002	0.0004	≤ 6.0
1,1-Dichloroethylene	mg/l	6200 B	< 0.0002	ND	≤ 0.1
cis-1,2-Dichloroethylene	mg/l	6200 B	< 0.0002	ND	≤ 2.0
trans-1,2-Dichloroethylene	mg/l	6200 B	< 0.0002	ND	≤ 5.0
Ethylbenzene	mg/l	6200 B	< 0.0002	ND	≤ 2.0
Styrene	mg/l	6200 B	< 0.0002	ND	≤ 24
Tetrachloroethylene	mg/l	6200 B	< 0.0002	ND	≤ 0.9
Toluene	mg/l	6200 B	< 0.0002	ND	≤ 5.0
1,1,1-Trichloroethane	mg/l	6200 B	< 0.0002	ND	≤ 0.2
1,1,2-Trichloroethane	mg/l	6200 B	< 0.0002	ND	≤ 0.8
Trichloroethylene	mg/l	6200 B	< 0.0002	ND	≤ 4.4
m-Xylene	mg/l	6200 B	< 0.0002	ND	≤ 24
o-Xylene	mg/l	6200 B	< 0.0002	ND	≤ 24
p-Xylene	mg/l	6200 B	< 0.0002	ND	≤ 24
Total Xylenes	mg/l	6200 B	< 0.0006	ND	≤ 24
Vinyl Chloride	mg/l	6200 B	< 0.0005	ND	≤ 0.03

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

Natsiri L.

(Miss Natsiri Lertterapipat)

Analyst

REG. NO. ๖-239-ท-0001

Araya Tipparuk

(Mrs. Araya Tipparuk)

Technical Management Team

REG. NO. ๖-239-ท-5863

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PARAMETER	UNIT	ANALYSIS	ND	STATION	STANDARD ^{1/}
		METHODS	(non-detectable)	MW-2	
<u>Total Petroleum Hydrocarbons</u>					
- C ₅ -C ₈	mg/l	5030 C / 8260 D	< 0.003	ND	≤ 1.4
- Pentane					
- Benzene					
- Toluene					
- m,p-Xylene					
- o-Xylene					
-C _{>8} -C ₁₆	mg/l	3510 C / 8015 D	< 0.025	ND	≤ 1.7
- n-Nonane					
- n-Decane					
- n-Dodecane					
- n-Tetradecane					
- n-Hexadecane					
-C _{>16} -C ₃₅	mg/l	3510 C / 8015 D	< 0.050	ND	≤ 0.1
- n-Octadecane					
- n-Eicosane					
- n-Docosane					
- n-Tetracosane					
- n-Hexacosane					
- n-Octacosane					
- n-Triacontane					
- n-Dotriacontane					
- n-Tetratriacontane					
- Pentatriacontane					

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

Natsiri L.
(Miss Natsiri Lertterapipat)

Analyst

REG. NO. ๖-239-ค-0001

(Mrs. Araya Tipparuk)

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SAMPLING DATE	: 06/09/2022	SAMPLING TIME	: 14:14-14:24
RECEIVED DATE	: 08/09/2022	ANALYTICAL DATE	: 06, 08-15/09/2022
REPORT DATE	: 21/09/2022	SITE OPERATOR	: Mr. Baworn Deechaiya
SAMPLE CONDITION	: Normal	FILE CODE	: 222100_GW_September

PARAMETER	UNIT	ANALYSIS METHODS	ND (non-detectable)	STATION MW-4
Depth	m	-	-	3.57
Temperature	°C	2550 B	< 0.5	29.9
pH	-	4500-H ⁺ B	< 0.10	6.68
Color	Unit	2120 B	< 5.0	220
Conductivity	µS/cm	2510 B	< 1.0	1,073
Total Dissolved Solids	mg/l	2540 C	< 50	684
Total Suspended Solids	mg/l	2540 D	< 5	94

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

(Miss Khemchuda Insorn)

Analyst

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SAMPLE CONDITION	: Normal		

PARAMETER	UNIT	ANALYSIS METHODS	ND (non-detectable)	STATION	STANDARD ^{1/}
				MW-4	
Benzene	mg/l	6200 B	< 0.0002	ND	≤ 0.2
Carbon tetrachloride	mg/l	6200 B	< 0.0002	ND	≤ 0.4
1,2-Dichloroethane	mg/l	6200 B	< 0.0002	ND	≤ 0.5
Dichloromethane	mg/l	6200 B	< 0.0002	0.0005	≤ 6.0
1,1-Dichloroethylene	mg/l	6200 B	< 0.0002	ND	≤ 0.1
cis-1,2-Dichloroethylene	mg/l	6200 B	< 0.0002	ND	≤ 2.0
trans-1,2-Dichloroethylene	mg/l	6200 B	< 0.0002	ND	≤ 5.0
Ethylbenzene	mg/l	6200 B	< 0.0002	ND	≤ 2.0
Styrene	mg/l	6200 B	< 0.0002	ND	≤ 24
Tetrachloroethylene	mg/l	6200 B	< 0.0002	ND	≤ 0.9
Toluene	mg/l	6200 B	< 0.0002	ND	≤ 5.0
1,1,1-Trichloroethane	mg/l	6200 B	< 0.0002	ND	≤ 0.2
1,1,2-Trichloroethane	mg/l	6200 B	< 0.0002	ND	≤ 0.8
Trichloroethylene	mg/l	6200 B	< 0.0002	ND	≤ 4.4
m-Xylene	mg/l	6200 B	< 0.0002	ND	≤ 24
o-Xylene	mg/l	6200 B	< 0.0002	ND	≤ 24
p-Xylene	mg/l	6200 B	< 0.0002	ND	≤ 24
Total Xylenes	mg/l	6200 B	< 0.0006	ND	≤ 24
Vinyl Chloride	mg/l	6200 B	< 0.0005	ND	≤ 0.03

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

Natsiri L.

(Miss Natsiri Lertterapipat)

Analyst

REG. NO. ๖-239-๓-0001

(Mrs. Araya Tipparuk)

Technical Management Team

REG. NO. ๖-239-๓-5863

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SAMPLE CONDITION	: Normal		

PARAMETER	UNIT	ANALYSIS METHODS	ND (non-detectable)	STATION MW-4	STANDARD ^{1/}
<u>Total Petroleum Hydrocarbons</u>					
- C ₅ -C ₈	mg/l	5030 C / 8260 D	< 0.003	ND	≤ 1.4
- Pentane					
- Benzene					
- Toluene					
- m,p-Xylene					
- o-Xylene					
- C ₈ -C ₁₆	mg/l	3510 C / 8015 D	< 0.025	ND	≤ 1.7
- n-Nonane					
- n-Decane					
- n-Dodecane					
- n-Tetradecane					
- n-Hexadecane					
- C ₁₆ -C ₃₅	mg/l	3510 C / 8015 D	< 0.050	ND	≤ 0.1
- n-Octadecane					
- n-Eicosane					
- n-Docosane					
- n-Tetracosane					
- n-Hexacosane					
- n-Octacosane					
- n-Triacontane					
- n-Dotriacontane					
- n-Tetratriacontane					
- Pentatriacontane					

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

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SAMPLING BY	: SECOT Co., Ltd.	SAMPLING TIME	: 10:39-10:50
SAMPLING DATE	: 06/09/2022	ANALYTICAL DATE	: 06, 08-15/09/2022
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SAMPLE CONDITION	: Normal		

PARAMETER	UNIT	ANALYSIS	ND	STATION
		METHODS	(non-detectable)	
Depth	m	-	-	4.80
Temperature	°C	2550 B	< 0.5	29.6
pH	-	4500-H ⁺ B	< 0.10	6.66
Color	Unit	2120 B	< 5.0	110
Conductivity	µS/cm	2510 B	< 1.0	880
Total Dissolved Solids	mg/l	2540 C	< 50	578
Total Suspended Solids	mg/l	2540 D	< 5	36

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

(Miss Khemchuda Insorn)

Analyst

(Mrs. Araya Tipparuk)

Technical Management Team

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PARAMETER	UNIT	ANALYSIS	ND	STATION	STANDARD ^{1/}
		METHODS	(non-detectable)	MW-6	
Benzene	mg/l	6200 B	< 0.0002	ND	≤ 0.2
Carbon tetrachloride	mg/l	6200 B	< 0.0002	ND	≤ 0.4
1,2-Dichloroethane	mg/l	6200 B	< 0.0002	ND	≤ 0.5
Dichloromethane	mg/l	6200 B	< 0.0002	0.0003	≤ 6.0
1,1-Dichloroethylene	mg/l	6200 B	< 0.0002	ND	≤ 0.1
cis-1,2-Dichloroethylene	mg/l	6200 B	< 0.0002	ND	≤ 2.0
trans-1,2-Dichloroethylene	mg/l	6200 B	< 0.0002	ND	≤ 5.0
Ethylbenzene	mg/l	6200 B	< 0.0002	ND	≤ 2.0
Styrene	mg/l	6200 B	< 0.0002	ND	≤ 24
Tetrachloroethylene	mg/l	6200 B	< 0.0002	ND	≤ 0.9
Toluene	mg/l	6200 B	< 0.0002	ND	≤ 5.0
1,1,1-Trichloroethane	mg/l	6200 B	< 0.0002	ND	≤ 0.2
1,1,2-Trichloroethane	mg/l	6200 B	< 0.0002	ND	≤ 0.8
Trichloroethylene	mg/l	6200 B	< 0.0002	ND	≤ 4.4
m-Xylene	mg/l	6200 B	< 0.0002	ND	≤ 24
o-Xylene	mg/l	6200 B	< 0.0002	ND	≤ 24
p-Xylene	mg/l	6200 B	< 0.0002	0.0006	≤ 24
Total Xylenes	mg/l	6200 B	< 0.0006	0.0006	≤ 24
Vinyl Chloride	mg/l	6200 B	< 0.0005	ND	≤ 0.03

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

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(Miss Natsiri Lertterapipat)

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PARAMETER	UNIT	ANALYSIS	ND	STATION	STANDARD ^{1/}
		METHODS	(non-detectable)	MW-6	
<u>Total Petroleum Hydrocarbons</u>					
- C ₅ -C ₈	mg/l	5030 C / 8260 D	< 0.003	0.031	≤ 1.4
- Pentane					
- Benzene					
- Toluene					
- m,p-Xylene					
- o-Xylene					
-C _{>8} -C ₁₆	mg/l	3510 C / 8015 D	< 0.025	0.167	≤ 1.7
- n-Nonane					
- n-Decane					
- n-Dodecane					
- n-Tetradecane					
- n-Hexadecane					
-C _{>16} -C ₃₅	mg/l	3510 C / 8015 D	< 0.050	0.077	≤ 0.1
- n-Octadecane					
- n-Eicosane					
- n-Docosane					
- n-Tetracosane					
- n-Hexacosane					
- n-Octacosane					
- n-Triacontane					
- n-Dotriacontane					
- n-Tetratriacontane					
- Pentatriacontane					

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

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SAMPLING BY	: SECOT Co., Ltd.	SAMPLING METHOD	: Pneumatic Bladder Pump
SAMPLING DATE	: 06/09/2022	SAMPLING TIME	: 14:53-15:03
RECEIVED DATE	: 08/09/2022	ANALYTICAL DATE	: 06, 08-15/09/2022
REPORT DATE	: 21/09/2022	SITE OPERATOR	: Mr. Baworn Deechaiya
SAMPLE CONDITION	: Normal	FILE CODE	: 222100_GW_September

PARAMETER	UNIT	ANALYSIS	ND	STATION
		METHODS	(non-detectable)	MW-7
Depth	m	-	-	3.95
Temperature	°C	2550 B	< 0.5	30.6
pH	-	4500-H ⁺ B	< 0.10	7.09
Color	Unit	2120 B	< 5.0	30
Conductivity	µS/cm	2510 B	< 1.0	351
Total Dissolved Solids	mg/l	2540 C	< 50	244
Total Suspended Solids	mg/l	2540 D	< 5	15

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

(Miss Khemchuda Insorn)

Analyst

(Mrs. Araya Tippiaruk)

Technical Management Team

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GROUND WATER ANALYSIS REPORT

CLIENT NAME	: Kuwait Petroleum Aviation (Thailand) Ltd.	REQUEST SERVICE No.	: 1825/65
	(Feeder Line Project)	SAMPLING METHOD	: Pneumatic Bladder Pump
SAMPLING BY	: SECOT Co., Ltd.	SAMPLING TIME	: 14:53-15:03
SAMPLING DATE	: 06/09/2022	ANALYTICAL DATE	: 12-14/09/2022
RECEIVED DATE	: 08/09/2022	SITE OPERATOR	: Mr. Baworn Deechaiya
REPORT DATE	: 21/09/2022	FILE CODE	: 222100_GW_September
SAMPLE CONDITION	: Normal		

PARAMETER	UNIT	ANALYSIS METHODS	ND (non-detectable)	STATION	STANDARD ^{1/}
				MW-7	
Benzene	mg/l	6200 B	< 0.0002	ND	≤ 0.2
Carbon tetrachloride	mg/l	6200 B	< 0.0002	ND	≤ 0.4
1,2-Dichloroethane	mg/l	6200 B	< 0.0002	ND	≤ 0.5
Dichloromethane	mg/l	6200 B	< 0.0002	0.0005	≤ 6.0
1,1-Dichloroethylene	mg/l	6200 B	< 0.0002	ND	≤ 0.1
cis-1,2-Dichloroethylene	mg/l	6200 B	< 0.0002	ND	≤ 2.0
trans-1,2-Dichloroethylene	mg/l	6200 B	< 0.0002	ND	≤ 5.0
Ethylbenzene	mg/l	6200 B	< 0.0002	ND	≤ 2.0
Styrene	mg/l	6200 B	< 0.0002	ND	≤ 24
Tetrachloroethylene	mg/l	6200 B	< 0.0002	ND	≤ 0.9
Toluene	mg/l	6200 B	< 0.0002	ND	≤ 5.0
1,1,1-Trichloroethane	mg/l	6200 B	< 0.0002	ND	≤ 0.2
1,1,2-Trichloroethane	mg/l	6200 B	< 0.0002	ND	≤ 0.8
Trichloroethylene	mg/l	6200 B	< 0.0002	ND	≤ 4.4
m-Xylene	mg/l	6200 B	< 0.0002	ND	≤ 24
o-Xylene	mg/l	6200 B	< 0.0002	ND	≤ 24
p-Xylene	mg/l	6200 B	< 0.0002	ND	≤ 24
Total Xylenes	mg/l	6200 B	< 0.0006	ND	≤ 24
Vinyl Chloride	mg/l	6200 B	< 0.0005	ND	≤ 0.03

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

Natsiri L.

(Miss Natsiri Lertterapipat)

Analyst

REG. NO. ๖-239-๓-0001

(Mrs. Araya Tipparuk)

Technical Management Team

REG. NO. ๖-239-๓-5863

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GROUND WATER ANALYSIS REPORT

CLIENT NAME	: Kuwait Petroleum Aviation (Thailand) Ltd.	REQUEST SERVICE No.	: 1825/65
	(Feeder Line Project)	SAMPLING METHOD	: Pneumatic Bladder Pump
SAMPLING BY	: SECOT Co., Ltd.	SAMPLING TIME	: 14:53-15:03
SAMPLING DATE	: 06/09/2022	ANALYTICAL DATE	: 12,16-20/09/2022
RECEIVED DATE	: 08/09/2022	SITE OPERATOR	: Mr. Baworn Deechaiya
REPORT DATE	: 21/09/2022	FILE CODE	: 222100_GW_September
SAMPLE CONDITION	: Normal		

PARAMETER	UNIT	ANALYSIS METHODS	ND (non-detectable)	STATION MW-7	STANDARD ^{1/}
<u>Total Petroleum Hydrocarbons</u>					
- C ₅ -C ₈	mg/l	5030 C / 8260 D	< 0.003	ND	≤ 1.4
- Pentane					
- Benzene					
- Toluene					
- m,p-Xylene					
- o-Xylene					
- C ₈ -C ₁₆	mg/l	3510 C / 8015 D	< 0.025	ND	≤ 1.7
- n-Nonane					
- n-Decane					
- n-Dodecane					
- n-Tetradecane					
- n-Hexadecane					
- C ₁₆ -C ₃₅	mg/l	3510 C / 8015 D	< 0.050	ND	≤ 0.1
- n-Octadecane					
- n-Eicosane					
- n-Docosane					
- n-Tetracosane					
- n-Hexacosane					
- n-Octacosane					
- n-Triacontane					
- n-Dotriacontane					
- n-Tetratriacontane					
- Pentatriacontane					

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

Natsiri L.

(Miss Natsiri Lerterapipat)

Analyst

REG. NO. ๖-239-ค-0001

(Mrs. Araya Tippasuk)

Technical Management Team

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GROUND WATER ANALYSIS REPORT

CLIENT NAME	: Kuwait Petroleum Aviation (Thailand) Ltd. (Feeder Line Project)	REQUEST SERVICE No.	: 1825/65
SAMPLING BY	: SECOT Co., Ltd.	SAMPLING METHOD	: Pneumatic Bladder Pump
SAMPLING DATE	: 05/09/2022	SAMPLING TIME	: 14:37-14:48
RECEIVED DATE	: 08/09/2022	ANALYTICAL DATE	: 05, 08-15/09/2022
REPORT DATE	: 21/09/2022	SITE OPERATOR	: Mr. Baworn Deechaiya
SAMPLE CONDITION	: Normal	FILE CODE	: 222100_GW_September

PARAMETER	UNIT	ANALYSIS	ND	STATION
		METHODS	(non-detectable)	MW-8
Depth	m	-	-	4.63
Temperature	°C	2550 B	< 0.5	31.4
pH	-	4500-H ⁺ B	< 0.10	5.03
Color	Unit	2120 B	< 5.0	20
Conductivity	µS/cm	2510 B	< 1.0	6,838
Total Dissolved Solids	mg/l	2540 C	< 50	4,444
Total Suspended Solids	mg/l	2540 D	< 5	16

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

(Miss Khemchuda Insorn)

Analyst

(Mrs. Araya Tipparuk)

Technical Management Team

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GROUND WATER ANALYSIS REPORT

CLIENT NAME	: Kuwait Petroleum Aviation (Thailand) Ltd.	REQUEST SERVICE No.	: 1825/65
	(Feeder Line Project)	SAMPLING METHOD	: Pneumatic Bladder Pump
SAMPLING BY	: SECOT Co., Ltd.	SAMPLING TIME	: 14:37-14:48
SAMPLING DATE	: 05/09/2022	ANALYTICAL DATE	: 12-14/09/2022
RECEIVED DATE	: 08/09/2022	SITE OPERATOR	: Mr. Baworn Deechaiya
REPORT DATE	: 21/09/2022	FILE CODE	: 222100_GW_September
SAMPLE CONDITION	: Normal		

PARAMETER	UNIT	ANALYSIS	ND	STATION	STANDARD ^{1/}
		METHODS	(non-detectable)	MW-8	
Benzene	mg/l	6200 B	< 0.0002	ND	≤ 0.2
Carbon tetrachloride	mg/l	6200 B	< 0.0002	ND	≤ 0.4
1,2-Dichloroethane	mg/l	6200 B	< 0.0002	ND	≤ 0.5
Dichloromethane	mg/l	6200 B	< 0.0002	0.0004	≤ 6.0
1,1-Dichloroethylene	mg/l	6200 B	< 0.0002	ND	≤ 0.1
cis-1,2-Dichloroethylene	mg/l	6200 B	< 0.0002	ND	≤ 2.0
trans-1,2-Dichloroethylene	mg/l	6200 B	< 0.0002	ND	≤ 5.0
Ethylbenzene	mg/l	6200 B	< 0.0002	ND	≤ 2.0
Styrene	mg/l	6200 B	< 0.0002	ND	≤ 24
Tetrachloroethylene	mg/l	6200 B	< 0.0002	ND	≤ 0.9
Toluene	mg/l	6200 B	< 0.0002	ND	≤ 5.0
1,1,1-Trichloroethane	mg/l	6200 B	< 0.0002	ND	≤ 0.2
1,1,2-Trichloroethane	mg/l	6200 B	< 0.0002	ND	≤ 0.8
Trichloroethylene	mg/l	6200 B	< 0.0002	ND	≤ 4.4
m-Xylene	mg/l	6200 B	< 0.0002	ND	≤ 24
o-Xylene	mg/l	6200 B	< 0.0002	ND	≤ 24
p-Xylene	mg/l	6200 B	< 0.0002	ND	≤ 24
Total Xylenes	mg/l	6200 B	< 0.0006	ND	≤ 24
Vinyl Chloride	mg/l	6200 B	< 0.0005	ND	≤ 0.03

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

Natsiri L.
(Miss Natsiri Lerterapipat)

Analyst

REG. NO. ๖-239-ก-0001


(Mrs. Araya Tipparuk)

Technical Management Team

REG. NO. ๖-239-ก-5863

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GROUND WATER ANALYSIS REPORT

CLIENT NAME	: Kuwait Petroleum Aviation (Thailand) Ltd.	REQUEST SERVICE No.	: 1825/65
	(Feeder Line Project)	SAMPLING METHOD	: Pneumatic Bladder Pump
SAMPLING BY	: SECOT Co., Ltd.	SAMPLING TIME	: 14:37-14:48
SAMPLING DATE	: 05/09/2022	ANALYTICAL DATE	: 12,16-20/09/2022
RECEIVED DATE	: 08/09/2022	SITE OPERATOR	: Mr. Baworn Deechaiya
REPORT DATE	: 21/09/2022	FILE CODE	: 222100_GW_September
SAMPLE CONDITION	: Normal		

PARAMETER	UNIT	ANALYSIS	ND	STATION	STANDARD ^{1/}
		METHODS	(non-detectable)	MW-8	
<u>Total Petroleum Hydrocarbons</u>					
- C ₅ -C ₈	mg/l	5030 C / 8260 D	< 0.003	ND	≤ 1.4
- Pentane					
- Benzene					
- Toluene					
- m,p-Xylene					
- o-Xylene					
-C _{>8} -C ₁₆	mg/l	3510 C / 8015 D	< 0.025	ND	≤ 1.7
- n-Nonane					
- n-Decane					
- n-Dodecane					
- n-Tetradecane					
- n-Hexadecane					
-C _{>16} -C ₃₅	mg/l	3510 C / 8015 D	< 0.050	ND	≤ 0.1
- n-Octadecane					
- n-Eicosane					
- n-Docosane					
- n-Tetracosane					
- n-Hexacosane					
- n-Octacosane					
- n-Triacontane					
- n-Dotriacontane					
- n-Tetratriacontane					
- Pentatriacontane					

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

Natsiri L.

(Miss Natsiri Lertterapipat)

Analyst

REG. NO. ๖-239-ก-0001

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Technical Management Team

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GROUND WATER ANALYSIS REPORT

CLIENT NAME	: Kuwait Petroleum Aviation (Thailand) Ltd. (Feeder Line Project)	REQUEST SERVICE No.	: 1825/65
SAMPLING BY	: SECOT Co., Ltd.	SAMPLING METHOD	: Pneumatic Bladder Pump
SAMPLING DATE	: 05/09/2022	SAMPLING TIME	: 15:10-15:19
RECEIVED DATE	: 08/09/2022	ANALYTICAL DATE	: 05, 08-15/09/2022
REPORT DATE	: 21/09/2022	SITE OPERATOR	: Mr. Baworn Deechaiya
SAMPLE CONDITION	: Normal	FILE CODE	: 222100_GW_September

PARAMETER	UNIT	ANALYSIS	ND	STATION
		METHODS	(non-detectable)	MW-10
Depth	m	-	-	3.44
Temperature	°C	2550 B	< 0.5	31.0
pH	-	4500-H ⁺ B	< 0.10	6.66
Color	Unit	2120 B	< 5.0	30
Conductivity	µS/cm	2510 B	< 1.0	713
Total Dissolved Solids	mg/l	2540 C	< 50	452
Total Suspended Solids	mg/l	2540 D	< 5	51

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



(Miss Khemchuda Insom)

Analyst



(Mrs. Araya Tippiaruk)

Technical Management Team

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GROUND WATER ANALYSIS REPORT

CLIENT NAME	: Kuwait Petroleum Aviation (Thailand) Ltd.	REQUEST SERVICE No.	: 1825/65
	(Feeder Line Project)	SAMPLING METHOD	: Pneumatic Bladder Pump
SAMPLING BY	: SECOT Co., Ltd.	SAMPLING TIME	: 15:10-15:19
SAMPLING DATE	: 05/09/2022	ANALYTICAL DATE	: 12-14/09/2022
RECEIVED DATE	: 08/09/2022	SITE OPERATOR	: Mr. Baworn Deechaiya
REPORT DATE	: 21/09/2022	FILE CODE	: 222100_GW_September
SAMPLE CONDITION	: Normal		

PARAMETER	UNIT	ANALYSIS METHODS	ND (non-detectable)	STATION	STANDARD ^{1/}
				MW-10	
Benzene	mg/l	6200 B	< 0.0002	ND	≤ 0.2
Carbon tetrachloride	mg/l	6200 B	< 0.0002	ND	≤ 0.4
1,2-Dichloroethane	mg/l	6200 B	< 0.0002	ND	≤ 0.5
Dichloromethane	mg/l	6200 B	< 0.0002	0.0004	≤ 6.0
1,1-Dichloroethylene	mg/l	6200 B	< 0.0002	ND	≤ 0.1
cis-1,2-Dichloroethylene	mg/l	6200 B	< 0.0002	ND	≤ 2.0
trans-1,2-Dichloroethylene	mg/l	6200 B	< 0.0002	ND	≤ 5.0
Ethylbenzene	mg/l	6200 B	< 0.0002	ND	≤ 2.0
Styrene	mg/l	6200 B	< 0.0002	ND	≤ 24
Tetrachloroethylene	mg/l	6200 B	< 0.0002	ND	≤ 0.9
Toluene	mg/l	6200 B	< 0.0002	ND	≤ 5.0
1,1,1-Trichloroethane	mg/l	6200 B	< 0.0002	ND	≤ 0.2
1,1,2-Trichloroethane	mg/l	6200 B	< 0.0002	ND	≤ 0.8
Trichloroethylene	mg/l	6200 B	< 0.0002	ND	≤ 4.4
m-Xylene	mg/l	6200 B	< 0.0002	ND	≤ 24
o-Xylene	mg/l	6200 B	< 0.0002	ND	≤ 24
p-Xylene	mg/l	6200 B	< 0.0002	ND	≤ 24
Total Xylenes	mg/l	6200 B	< 0.0006	ND	≤ 24
Vinyl Chloride	mg/l	6200 B	< 0.0005	ND	≤ 0.03

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

Natsiri L.

(Miss Natsiri Lerterapipat)

Analyst

REG. NO. ๖-239-๓-0001

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GROUND WATER ANALYSIS REPORT

CLIENT NAME	: Kuwait Petroleum Aviation (Thailand) Ltd.	REQUEST SERVICE No.	: 1825/65
	(Feeder Line Project)	SAMPLING METHOD	: Pneumatic Bladder Pump
SAMPLING BY	: SECOT Co., Ltd.	SAMPLING TIME	: 15:10-15:19
SAMPLING DATE	: 05/09/2022	ANALYTICAL DATE	: 12,16-20/09/2022
RECEIVED DATE	: 08/09/2022	SITE OPERATOR	: Mr. Baworn Deechaiya
REPORT DATE	: 21/09/2022	FILE CODE	: 222100_GW_September
SAMPLE CONDITION	: Normal		

PARAMETER	UNIT	ANALYSIS METHODS	ND (non-detectable)	STATION MW-10	STANDARD ^{1/}
<u>Total Petroleum Hydrocarbons</u>					
- C ₅ -C ₈	mg/l	5030 C / 8260 D	< 0.003	ND	≤ 1.4
- Pentane					
- Benzene					
- Toluene					
- m,p-Xylene					
- o-Xylene					
- C ₈ -C ₁₆	mg/l	3510 C / 8015 D	< 0.025	ND	≤ 1.7
- n-Nonane					
- n-Decane					
- n-Dodecane					
- n-Tetradecane					
- n-Hexadecane					
- C ₁₆ -C ₃₅	mg/l	3510 C / 8015 D	< 0.050	ND	≤ 0.1
- n-Octadecane					
- n-Eicosane					
- n-Docosane					
- n-Tetracosane					
- n-Hexacosane					
- n-Octacosane					
- n-Triacontane					
- n-Dotriacontane					
- n-Tetatriacontane					
- Pentatriacontane					

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

Natsiri L.

(Miss Natsiri Lertterapipat)

Analyst

REG. NO. ว-239-ก-0001

(Mrs. Araya Tipparuk)

Technical Management Team

REG. NO. ว-239-ก-5863

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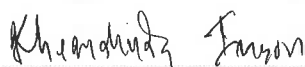
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GROUND WATER ANALYSIS REPORT

CLIENT NAME	: Kuwait Petroleum Aviation (Thailand) Ltd.	REQUEST SERVICE No.	: 1825/65
	(Feeder Line Project)	SAMPLING METHOD	: Pneumatic Bladder Pump
SAMPLING BY	: SECOT Co., Ltd.	SAMPLING TIME	: 11:11-11:21
SAMPLING DATE	: 06/09/2022	ANALYTICAL DATE	: 06, 08-15/09/2022
RECEIVED DATE	: 08/09/2022	SITE OPERATOR	: Mr. Baworn Deechaiya
REPORT DATE	: 21/09/2022	FILE CODE	: 222100_GW_September
SAMPLE CONDITION	: Normal		

PARAMETER	UNIT	ANALYSIS	ND	STATION
		METHODS	(non-detectable)	
Depth	m	-	-	4.25
Temperature	°C	2550 B	< 0.5	29.8
pH	-	4500-H ⁺ B	< 0.10	6.87
Color	Unit	2120 B	< 5.0	25
Conductivity	µS/cm	2510 B	< 1.0	692
Total Dissolved Solids	mg/l	2540 C	< 50	488
Total Suspended Solids	mg/l	2540 D	< 5	45

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



(Miss Khemchuda Insorn)

Analyst



(Mrs. Araya Tipparuk)

Technical Management Team

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GROUND WATER ANALYSIS REPORT

CLIENT NAME	: Kuwait Petroleum Aviation (Thailand) Ltd.	REQUEST SERVICE No.	: 1825/65
	(Feeder Line Project)	SAMPLING METHOD	: Pneumatic Bladder Pump
SAMPLING BY	: SECOT Co., Ltd.	SAMPLING TIME	: 11:11-11:21
SAMPLING DATE	: 06/09/2022	ANALYTICAL DATE	: 12-14/09/2022
RECEIVED DATE	: 08/09/2022	SITE OPERATOR	: Mr. Baworn Deechaiya
REPORT DATE	: 21/09/2022	FILE CODE	: 222100_GW_September
SAMPLE CONDITION	: Normal		

PARAMETER	UNIT	ANALYSIS METHODS	ND (non-detectable)	STATION	STANDARD ^{1/}
				MW-16	
Benzene	mg/l	6200 B	< 0.0002	ND	≤ 0.2
Carbon tetrachloride	mg/l	6200 B	< 0.0002	ND	≤ 0.4
1,2-Dichloroethane	mg/l	6200 B	< 0.0002	ND	≤ 0.5
Dichloromethane	mg/l	6200 B	< 0.0002	0.0003	≤ 6.0
1,1-Dichloroethylene	mg/l	6200 B	< 0.0002	ND	≤ 0.1
cis-1,2-Dichloroethylene	mg/l	6200 B	< 0.0002	ND	≤ 2.0
trans-1,2-Dichloroethylene	mg/l	6200 B	< 0.0002	ND	≤ 5.0
Ethylbenzene	mg/l	6200 B	< 0.0002	ND	≤ 2.0
Styrene	mg/l	6200 B	< 0.0002	ND	≤ 24
Tetrachloroethylene	mg/l	6200 B	< 0.0002	ND	≤ 0.9
Toluene	mg/l	6200 B	< 0.0002	ND	≤ 5.0
1,1,1-Trichloroethane	mg/l	6200 B	< 0.0002	ND	≤ 0.2
1,1,2-Trichloroethane	mg/l	6200 B	< 0.0002	ND	≤ 0.8
Trichloroethylene	mg/l	6200 B	< 0.0002	ND	≤ 4.4
m-Xylene	mg/l	6200 B	< 0.0002	ND	≤ 24
o-Xylene	mg/l	6200 B	< 0.0002	ND	≤ 24
p-Xylene	mg/l	6200 B	< 0.0002	ND	≤ 24
Total Xylenes	mg/l	6200 B	< 0.0006	ND	≤ 24
Vinyl Chloride	mg/l	6200 B	< 0.0005	ND	≤ 0.03

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

Natsiri L.

(Miss Natsiri Lertterapipat)

Analyst

REG. NO. ๖-239-ก-0001

(Mrs. Araya Tipparuk)

Technical Management Team

REG. NO. ๖-239-ก-5863

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GROUND WATER ANALYSIS REPORT

CLIENT NAME	: Kuwait Petroleum Aviation (Thailand) Ltd. (Feeder Line Project)	REQUEST SERVICE No.	: 1825/65
SAMPLING BY	: SECOT Co., Ltd.	SAMPLING METHOD	: Pneumatic Bladder Pump
SAMPLING DATE	: 06/09/2022	SAMPLING TIME	: 11:11-11:21
RECEIVED DATE	: 08/09/2022	ANALYTICAL DATE	: 12,16-20/09/2022
REPORT DATE	: 21/09/2022	SITE OPERATOR	: Mr. Baworn Deechaiya
SAMPLE CONDITION	: Normal	FILE CODE	: 222100_GW_September

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

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

Natsiri L.

(Miss Natsiri Lertterapipat)

Analyst

REG. NO. ๓-239-ท-0001

(Mrs. Araya Tipparuk)

Technical Management Team

REG. NO. ๓-239-ท-5863

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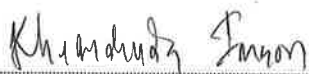
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GROUND WATER ANALYSIS REPORT

CLIENT NAME	: Kuwait Petroleum Aviation (Thailand) Ltd. (Feeder Line Project)	REQUEST SERVICE No.	: 1825/65
SAMPLING BY	: SECOT Co., Ltd.	SAMPLING METHOD	: Pneumatic Bladder Pump
SAMPLING DATE	: 06/09/2022	SAMPLING TIME	: 10:01-10:12
RECEIVED DATE	: 08/09/2022	ANALYTICAL DATE	: 06, 08-15/09/2022
REPORT DATE	: 21/09/2022	SITE OPERATOR	: Mr. Baworn Deechaiya
SAMPLE CONDITION	: Normal	FILE CODE	: 222100_GW_September

PARAMETER	UNIT	ANALYSIS	ND	STATION
		METHODS	(non-detectable)	GW-1
Depth	m	-	-	4.95
Temperature	°C	2550 B	< 0.5	31.3
pH	-	4500-H ⁺ B	< 0.10	3.71
Color	Unit	2120 B	< 5.0	20
Conductivity	µS/cm	2510 B	< 1.0	6,571
Total Dissolved Solids	mg/l	2540 C	< 50	3,834
Total Suspended Solids	mg/l	2540 D	< 5	7

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



(Miss Khemchuda Insorn)

Analyst



(Mrs. Araya Tipparuk)

Technical Management Team

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REPORT DATE	: 21/09/2022	FILE CODE	: 222100_GW_September
SAMPLE CONDITION	: Normal		

PARAMETER	UNIT	ANALYSIS METHODS	ND (non-detectable)	STATION	STANDARD ^{1/}
				GW-1	
Benzene	mg/l	6200 B	< 0.0002	ND	≤ 0.2
Carbon tetrachloride	mg/l	6200 B	< 0.0002	ND	≤ 0.4
1,2-Dichloroethane	mg/l	6200 B	< 0.0002	ND	≤ 0.5
Dichloromethane	mg/l	6200 B	< 0.0002	0.0004	≤ 6.0
1,1-Dichloroethylene	mg/l	6200 B	< 0.0002	ND	≤ 0.1
cis-1,2-Dichloroethylene	mg/l	6200 B	< 0.0002	ND	≤ 2.0
trans-1,2-Dichloroethylene	mg/l	6200 B	< 0.0002	ND	≤ 5.0
Ethylbenzene	mg/l	6200 B	< 0.0002	ND	≤ 2.0
Styrene	mg/l	6200 B	< 0.0002	ND	≤ 24
Tetrachloroethylene	mg/l	6200 B	< 0.0002	ND	≤ 0.9
Toluene	mg/l	6200 B	< 0.0002	ND	≤ 5.0
1,1,1-Trichloroethane	mg/l	6200 B	< 0.0002	ND	≤ 0.2
1,1,2-Trichloroethane	mg/l	6200 B	< 0.0002	ND	≤ 0.8
Trichloroethylene	mg/l	6200 B	< 0.0002	ND	≤ 4.4
m-Xylene	mg/l	6200 B	< 0.0002	ND	≤ 24
o-Xylene	mg/l	6200 B	< 0.0002	ND	≤ 24
p-Xylene	mg/l	6200 B	< 0.0002	ND	≤ 24
Total Xylenes	mg/l	6200 B	< 0.0006	ND	≤ 24
Vinyl Chloride	mg/l	6200 B	< 0.0005	ND	≤ 0.03

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

Natsiri L.
(Miss Natsiri Lertterapipat)

Analyst

REG. NO. ๖-239-๓-0001

(Mrs. Araya Tipparuk)

Technical Management Team

REG. NO. ๖-239-๓-5863

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SAMPLING BY	: SECOT Co., Ltd.	SAMPLING TIME	: 10:01-10:12
SAMPLING DATE	: 06/09/2022	ANALYTICAL DATE	: 12,16-20/09/2022
RECEIVED DATE	: 08/09/2022	SITE OPERATOR	: Mr. Baworn Deechaiya
REPORT DATE	: 21/09/2022	FILE CODE	: 222100_GW_September
SAMPLE CONDITION	: Normal		

PARAMETER	UNIT	ANALYSIS METHODS	ND (non-detectable)	STATION GW-1	STANDARD ^{1/}
<u>Total Petroleum Hydrocarbons</u>					
- C ₅ -C ₈	mg/l	5030 C / 8260 D	< 0.003	ND	≤ 1.4
- Pentane					
- Benzene					
- Toluene					
- m,p-Xylene					
- o-Xylene					
- C ₈ -C ₁₆	mg/l	3510 C / 8015 D	< 0.025	ND	≤ 1.7
- n-Nonane					
- n-Decane					
- n-Dodecane					
- n-Tetradecane					
- n-Hexadecane					
- C ₁₆ -C ₃₅	mg/l	3510 C / 8015 D	< 0.050	ND	≤ 0.1
- n-Octadecane					
- n-Eicosane					
- n-Docosane					
- n-Tetracosane					
- n-Hexacosane					
- n-Octacosane					
- n-Triacontane					
- n-Dotriacontane					
- n-Tetracontane					
- Pentatriacontane					

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

Natsiri L.

(Miss Natsiri Lertterapipat)

Analyst

REG. NO. ๖-239-๓-0001

~TR

(Mrs. Araya Tipparuk)

Technical Management Team

REG. NO. ๖-239-๓-5863

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GROUND WATER ANALYSIS REPORT

CLIENT NAME	: Kuwait Petroleum Aviation (Thailand) Ltd.	REQUEST SERVICE No.	: 1825/65
	(Feeder Line Project)	SAMPLING METHOD	: Pneumatic Bladder Pump
SAMPLING BY	: SECOT Co., Ltd.	SAMPLING TIME	: 13:55-14:10
SAMPLING DATE	: 05/09/2022	ANALYTICAL DATE	: 05, 08-15/09/2022
RECEIVED DATE	: 08/09/2022	SITE OPERATOR	: Mr. Baworn Deechaiya
REPORT DATE	: 21/09/2022	FILE CODE	: 222100_GW_September
SAMPLE CONDITION	: Normal		

PARAMETER	UNIT	ANALYSIS	ND	STATION
		METHODS	(non-detectable)	GW-4
Depth	m	-	-	3.52
Temperature	°C	2550 B	< 0.5	31.9
pH	-	4500-H ⁺ B	< 0.10	6.97
Color	Unit	2120 B	< 5.0	260
Conductivity	µS/cm	2510 B	< 1.0	806
Total Dissolved Solids	mg/l	2540 C	< 50	584
Total Suspended Solids	mg/l	2540 D	< 5	5

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

(Miss Khemchuda Insorn)

Analyst

(Mrs. Araya Tipparuk)

Technical Management Team

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SAMPLING DATE	: 05/09/2022	ANALYTICAL DATE	: 12-14/09/2022
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REPORT DATE	: 21/09/2022	FILE CODE	: 222100_GW_September
SAMPLE CONDITION	: Normal		

PARAMETER	UNIT	ANALYSIS METHODS	ND (non-detectable)	STATION	STANDARD ^{1/}
				GW-4	
Benzene	mg/l	6200 B	< 0.0002	ND	≤ 0.2
Carbon tetrachloride	mg/l	6200 B	< 0.0002	ND	≤ 0.4
1,2-Dichloroethane	mg/l	6200 B	< 0.0002	ND	≤ 0.5
Dichloromethane	mg/l	6200 B	< 0.0002	0.0006	≤ 6.0
1,1-Dichloroethylene	mg/l	6200 B	< 0.0002	ND	≤ 0.1
cis-1,2-Dichloroethylene	mg/l	6200 B	< 0.0002	ND	≤ 2.0
trans-1,2-Dichloroethylene	mg/l	6200 B	< 0.0002	ND	≤ 5.0
Ethylbenzene	mg/l	6200 B	< 0.0002	ND	≤ 2.0
Styrene	mg/l	6200 B	< 0.0002	ND	≤ 24
Tetrachloroethylene	mg/l	6200 B	< 0.0002	ND	≤ 0.9
Toluene	mg/l	6200 B	< 0.0002	ND	≤ 5.0
1,1,1-Trichloroethane	mg/l	6200 B	< 0.0002	ND	≤ 0.2
1,1,2-Trichloroethane	mg/l	6200 B	< 0.0002	ND	≤ 0.8
Trichloroethylene	mg/l	6200 B	< 0.0002	ND	≤ 4.4
m-Xylene	mg/l	6200 B	< 0.0002	ND	≤ 24
o-Xylene	mg/l	6200 B	< 0.0002	ND	≤ 24
p-Xylene	mg/l	6200 B	< 0.0002	ND	≤ 24
Total Xylenes	mg/l	6200 B	< 0.0006	ND	≤ 24
Vinyl Chloride	mg/l	6200 B	< 0.0005	ND	≤ 0.03

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

Natsiri L.

(Miss Natsiri Lertterapipat)

Analyst

REG. NO. ๖-239-๓-0001

(Mrs. Araya Tipparuk)

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GROUND WATER ANALYSIS REPORT

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SAMPLING BY	: SECOT Co., Ltd.	SAMPLING METHOD	: Pneumatic Bladder Pump
SAMPLING DATE	: 05/09/2022	SAMPLING TIME	: 13:55-14:10
RECEIVED DATE	: 08/09/2022	ANALYTICAL DATE	: 12,16-20/09/2022
REPORT DATE	: 21/09/2022	SITE OPERATOR	: Mr. Baworn Deechaiya
SAMPLE CONDITION	: Normal	FILE CODE	: 222100_GW_September

PARAMETER	UNIT	ANALYSIS METHODS	ND (non-detectable)	STATION GW-4	STANDARD ^{1/}
<u>Total Petroleum Hydrocarbons</u>					
- C ₅ -C ₈	mg/l	5030 C / 8260 D	< 0.003	ND	≤ 1.4
- Pentane					
- Benzene					
- Toluene					
- m,p-Xylene					
- o-Xylene					
- C ₈ -C ₁₆	mg/l	3510 C / 8015 D	< 0.025	ND	≤ 1.7
- n-Nonane					
- n-Decane					
- n-Dodecane					
- n-Tetradecane					
- n-Hexadecane					
- C ₁₆ -C ₃₅	mg/l	3510 C / 8015 D	< 0.050	ND	≤ 0.1
- n-Octadecane					
- n-Eicosane					
- n-Docosane					
- n-Tetracosane					
- n-Hexacosane					
- n-Octacosane					
- n-Triacontane					
- n-Dotriacontane					
- n-Tetratriacontane					
- Pentatriacontane					

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

Natsiri L.
(Miss Natsiri Lertterapat)

Analyst

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GROUND WATER ANALYSIS REPORT

CLIENT NAME	: Kuwait Petroleum Aviation (Thailand) Ltd.	REQUEST SERVICE No.	: 1825/65
	(Feeder Line Project)	SAMPLING METHOD	: Pneumatic Bladder Pump
SAMPLING BY	: SECOT Co., Ltd.	SAMPLING TIME	: 11:27-11:38
SAMPLING DATE	: 05/09/2022	ANALYTICAL DATE	: 05, 08-15/09/2022
RECEIVED DATE	: 08/09/2022	SITE OPERATOR	: Mr. Baworn Deechaiya
REPORT DATE	: 21/09/2022	FILE CODE	: 222100_GW_September
SAMPLE CONDITION	: Normal		

PARAMETER	UNIT	ANALYSIS	ND	STATION
		METHODS	(non-detectable)	GW-5
Depth	m	-	-	2.90
Temperature	°C	2550 B	< 0.5	30.4
pH	-	4500-H ⁺ B	< 0.10	6.23
Color	Unit	2120 B	< 5.0	230
Conductivity	µS/cm	2510 B	< 1.0	251
Total Dissolved Solids	mg/l	2540 C	< 50	192
Total Suspended Solids	mg/l	2540 D	< 5	< 5

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

(Miss Khemchuda Insorn)

Analyst

(Mrs. Araya Tipparuk)

Technical Management Team

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GROUND WATER ANALYSIS REPORT

CLIENT NAME	: Kuwait Petroleum Aviation (Thailand) Ltd.	REQUEST SERVICE No.	: 1825/65
	(Feeder Line Project)	SAMPLING METHOD	: Pneumatic Bladder Pump
SAMPLING BY	: SECOT Co., Ltd.	SAMPLING TIME	: 11:27-11:38
SAMPLING DATE	: 05/09/2022	ANALYTICAL DATE	: 12-14/09/2022
RECEIVED DATE	: 08/09/2022	SITE OPERATOR	: Mr. Baworn Deechaiya
REPORT DATE	: 21/09/2022	FILE CODE	: 222100_GW_September
SAMPLE CONDITION	: Normal		

PARAMETER	UNIT	ANALYSIS METHODS	ND (non-detectable)	STATION	STANDARD ^{1/}
				GW-5	
Benzene	mg/l	6200 B	< 0.0002	ND	≤ 0.2
Carbon tetrachloride	mg/l	6200 B	< 0.0002	ND	≤ 0.4
1,2-Dichloroethane	mg/l	6200 B	< 0.0002	ND	≤ 0.5
Dichloromethane	mg/l	6200 B	< 0.0002	0.0005	≤ 6.0
1,1-Dichloroethylene	mg/l	6200 B	< 0.0002	ND	≤ 0.1
cis-1,2-Dichloroethylene	mg/l	6200 B	< 0.0002	ND	≤ 2.0
trans-1,2-Dichloroethylene	mg/l	6200 B	< 0.0002	ND	≤ 5.0
Ethylbenzene	mg/l	6200 B	< 0.0002	ND	≤ 2.0
Styrene	mg/l	6200 B	< 0.0002	ND	≤ 24
Tetrachloroethylene	mg/l	6200 B	< 0.0002	ND	≤ 0.9
Toluene	mg/l	6200 B	< 0.0002	ND	≤ 5.0
1,1,1-Trichloroethane	mg/l	6200 B	< 0.0002	ND	≤ 0.2
1,1,2-Trichloroethane	mg/l	6200 B	< 0.0002	ND	≤ 0.8
Trichloroethylene	mg/l	6200 B	< 0.0002	ND	≤ 4.4
m-Xylene	mg/l	6200 B	< 0.0002	ND	≤ 24
o-Xylene	mg/l	6200 B	< 0.0002	ND	≤ 24
p-Xylene	mg/l	6200 B	< 0.0002	ND	≤ 24
Total Xylenes	mg/l	6200 B	< 0.0006	ND	≤ 24
Vinyl Chloride	mg/l	6200 B	< 0.0005	ND	≤ 0.03

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

Natsiri L.
(Miss Natsiri Lertterapipat)

Analyst

REG. NO. ๖-239-ก-0001

(Mrs. Araya Tipparuk)

Technical Management Team

REG. NO. ๖-239-ก-5863

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

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3. ^{1/} Notification of the Ministry of Industry, B.E.2559 (2016).



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GROUND WATER ANALYSIS REPORT

CLIENT NAME	: Kuwait Petroleum Aviation (Thailand) Ltd. (Feeder Line Project)	REQUEST SERVICE No.	: 1825/65
SAMPLING BY	: SECOT Co., Ltd.	SAMPLING METHOD	: Pneumatic Bladder Pump
SAMPLING DATE	: 05/09/2022	SAMPLING TIME	: 11:27-11:38
RECEIVED DATE	: 08/09/2022	ANALYTICAL DATE	: 12,16-20/09/2022
REPORT DATE	: 21/09/2022	SITE OPERATOR	: Mr. Baworn Deechaiya
SAMPLE CONDITION	: Normal	FILE CODE	: 222100_GW_September

PARAMETER	UNIT	ANALYSIS	ND	STATION	STANDARD ^{1/}
		METHODS	(non-detectable)	GW-5	
<u>Total Petroleum Hydrocarbons</u>					
- C ₅ -C ₈	mg/l	5030 C / 8260 D	< 0.003	ND	≤ 1.4
- Pentane					
- Benzene					
- Toluene					
- m,p-Xylene					
- o-Xylene					
-C _{>8} -C ₁₆	mg/l	3510 C / 8015 D	< 0.025	ND	≤ 1.7
- n-Nonane					
- n-Decane					
- n-Dodecane					
- n-Tetradecane					
- n-Hexadecane					
-C _{>16} -C ₃₅	mg/l	3510 C / 8015 D	< 0.050	ND	≤ 0.1
- n-Octadecane					
- n-Eicosane					
- n-Docosane					
- n-Tetracosane					
- n-Hexacosane					
- n-Octacosane					
- n-Triacontane					
- n-Dotriacontane					
- n-Tetratriacontane					
- Pentatriacontane					

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

Natsiri L.
(Miss Natsiri Lertterapipat)

Analyst

REG. NO. ๖-239-ท-0001

(Mrs. Araya Tippiaruk)

Technical Management Team

REG. NO. ๖-239-ท-5863

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GROUND WATER ANALYSIS REPORT

CLIENT NAME	: Kuwait Petroleum Aviation (Thailand) Ltd.	REQUEST SERVICE No.	: 1825/65
	(Feeder Line Project)	SAMPLING METHOD	: Pneumatic Bladder Pump
SAMPLING BY	: SECOT Co., Ltd.	SAMPLING TIME	: 10:41-10:55
SAMPLING DATE	: 05/09/2022	ANALYTICAL DATE	: 05, 08-15/09/2022
RECEIVED DATE	: 08/09/2022	SITE OPERATOR	: Mr. Baworn Deechaiya
REPORT DATE	: 21/09/2022	FILE CODE	: 222100_GW_September
SAMPLE CONDITION	: Normal		

PARAMETER	UNIT	ANALYSIS	ND	STATION
		METHODS	(non-detectable)	GW-8
Depth	m	-	-	3.21
Temperature	°C	2550 B	< 0.5	30.7
pH	-	4500-H ⁺ B	< 0.10	6.63
Color	Unit	2120 B	< 5.0	45
Conductivity	µS/cm	2510 B	< 1.0	380
Total Dissolved Solids	mg/l	2540 C	< 50	246
Total Suspended Solids	mg/l	2540 D	< 5	< 5

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

(Miss Khemchuda Insorn)

Analyst

(Mrs. Araya Tippiaruk)

Technical Management Team

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REPORT DATE	: 21/09/2022	FILE CODE	: 222100_GW_September
SAMPLE CONDITION	: Normal		

PARAMETER	UNIT	ANALYSIS	ND	STATION	STANDARD ^{1/}
		METHODS	(non-detectable)	GW-8	
Benzene	mg/l	6200 B	< 0.0002	ND	≤ 0.2
Carbon tetrachloride	mg/l	6200 B	< 0.0002	ND	≤ 0.4
1,2-Dichloroethane	mg/l	6200 B	< 0.0002	ND	≤ 0.5
Dichloromethane	mg/l	6200 B	< 0.0002	0.0003	≤ 6.0
1,1-Dichloroethylene	mg/l	6200 B	< 0.0002	ND	≤ 0.1
cis-1,2-Dichloroethylene	mg/l	6200 B	< 0.0002	ND	≤ 2.0
trans-1,2-Dichloroethylene	mg/l	6200 B	< 0.0002	ND	≤ 5.0
Ethylbenzene	mg/l	6200 B	< 0.0002	ND	≤ 2.0
Styrene	mg/l	6200 B	< 0.0002	ND	≤ 24
Tetrachloroethylene	mg/l	6200 B	< 0.0002	ND	≤ 0.9
Toluene	mg/l	6200 B	< 0.0002	ND	≤ 5.0
1,1,1-Trichloroethane	mg/l	6200 B	< 0.0002	ND	≤ 0.2
1,1,2-Trichloroethane	mg/l	6200 B	< 0.0002	ND	≤ 0.8
Trichloroethylene	mg/l	6200 B	< 0.0002	ND	≤ 4.4
m-Xylene	mg/l	6200 B	< 0.0002	ND	≤ 24
o-Xylene	mg/l	6200 B	< 0.0002	ND	≤ 24
p-Xylene	mg/l	6200 B	< 0.0002	ND	≤ 24
Total Xylenes	mg/l	6200 B	< 0.0006	ND	≤ 24
Vinyl Chloride	mg/l	6200 B	< 0.0005	ND	≤ 0.03

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

Natsiri L.

(Miss Natsiri Lertterapipat)

Analyst

REG. NO. ๖-239-๓-0001

(Mrs. Araya Tippiaruk)

Technical Management Team

REG. NO. ๖-239-๓-5863

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REPORT DATE	: 21/09/2022	SITE OPERATOR	: Mr. Baworn Deechaiya
SAMPLE CONDITION	: Normal	FILE CODE	: 222100_GW_September

PARAMETER	UNIT	ANALYSIS	ND	STATION	STANDARD ^{1/}
		METHODS	(non-detectable)	GW-8	
Total Petroleum Hydrocarbons					
- C ₅ -C ₈	mg/l	5030 C / 8260 D	< 0.003	ND	≤ 1.4
- Pentane					
- Benzene					
- Toluene					
- m,p-Xylene					
- o-Xylene					
-C ₈ -C ₁₆	mg/l	3510 C / 8015 D	< 0.025	ND	≤ 1.7
- n-Nonane					
- n-Decane					
- n-Dodecane					
- n-Tetradecane					
- n-Hexadecane					
-C _{>16} -C ₃₅	mg/l	3510 C / 8015 D	< 0.050	ND	≤ 0.1
- n-Octadecane					
- n-Eicosane					
- n-Docosane					
- n-Tetracosane					
- n-Hexacosane					
- n-Octacosane					
- n-Triacontane					
- n-Dotriacontane					
- n-Tetratriacontane					
- Pentatriacontane					

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

Natsiri L.

(Miss Natsiri Lertterapipat)

Analyst

REG. NO. ๖-239-ค-0001

(Mrs. Araya Tipparuk)

Technical Management Team

REG. NO. ๖-239-ค-5863

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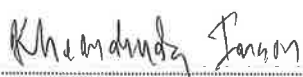
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GROUND WATER ANALYSIS REPORT

CLIENT NAME	: Kuwait Petroleum Aviation (Thailand) Ltd.	REQUEST SERVICE No.	: 1825/65
	(Feeder Line Project)	SAMPLING METHOD	: Pneumatic Bladder Pump
SAMPLING BY	: SECOT Co., Ltd.	SAMPLING TIME	: 11:38-11:50
SAMPLING DATE	: 07/09/2022	ANALYTICAL DATE	: 07, 08-15/09/2022
RECEIVED DATE	: 08/09/2022	SITE OPERATOR	: Mr. Baworn Deechaiya
REPORT DATE	: 21/09/2022	FILE CODE	: 222100_GW_September
SAMPLE CONDITION	: Normal		

PARAMETER	UNIT	ANALYSIS	ND	STATION
		METHODS	(non-detectable)	GW-11
Depth	m	-	-	2.84
Temperature	°C	2550 B	< 0.5	30.2
pH	-	4500-H ⁺ B	< 0.10	6.69
Color	Unit	2120 B	< 5.0	240
Conductivity	µS/cm	2510 B	< 1.0	1,093
Total Dissolved Solids	mg/l	2540 C	< 50	628
Total Suspended Solids	mg/l	2540 D	< 5	99

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



(Miss Khemchuda Insorn)

Analyst



(Mrs. Araya Tipparuk)

Technical Management Team

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SAMPLE CONDITION	: Normal		

PARAMETER	UNIT	ANALYSIS METHODS	ND (non-detectable)	STATION	STANDARD ^{1/}
				GW-11	
Benzene	mg/l	6200 B	< 0.0002	ND	≤ 0.2
Carbon tetrachloride	mg/l	6200 B	< 0.0002	ND	≤ 0.4
1,2-Dichloroethane	mg/l	6200 B	< 0.0002	ND	≤ 0.5
Dichloromethane	mg/l	6200 B	< 0.0002	0.0003	≤ 6.0
1,1-Dichloroethylene	mg/l	6200 B	< 0.0002	ND	≤ 0.1
cis-1,2-Dichloroethylene	mg/l	6200 B	< 0.0002	ND	≤ 2.0
trans-1,2-Dichloroethylene	mg/l	6200 B	< 0.0002	ND	≤ 5.0
Ethylbenzene	mg/l	6200 B	< 0.0002	ND	≤ 2.0
Styrene	mg/l	6200 B	< 0.0002	ND	≤ 24
Tetrachloroethylene	mg/l	6200 B	< 0.0002	ND	≤ 0.9
Toluene	mg/l	6200 B	< 0.0002	ND	≤ 5.0
1,1,1-Trichloroethane	mg/l	6200 B	< 0.0002	ND	≤ 0.2
1,1,2-Trichloroethane	mg/l	6200 B	< 0.0002	ND	≤ 0.8
Trichloroethylene	mg/l	6200 B	< 0.0002	ND	≤ 4.4
m-Xylene	mg/l	6200 B	< 0.0002	ND	≤ 24
o-Xylene	mg/l	6200 B	< 0.0002	ND	≤ 24
p-Xylene	mg/l	6200 B	< 0.0002	ND	≤ 24
Total Xylenes	mg/l	6200 B	< 0.0006	ND	≤ 24
Vinyl Chloride	mg/l	6200 B	< 0.0005	ND	≤ 0.03

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

Natsiri L.

(Miss Natsiri Lertterapipat)

Analyst

REG. NO. ๖-239-ค-0001

(Mrs. Araya Tipparuk)

Technical Management Team

REG. NO. ๖-239-ค-5863

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RECEIVED DATE	: 08/09/2022	SITE OPERATOR	: Mr. Baworn Deechaiya
REPORT DATE	: 21/09/2022	FILE CODE	: 222100_GW_September
SAMPLE CONDITION	: Normal		

PARAMETER	UNIT	ANALYSIS METHODS	ND (non-detectable)	STATION GW-11	STANDARD ^{1/}
<u>Total Petroleum Hydrocarbons</u>					
- C ₅ -C ₈	mg/l	5030 C / 8260 D	< 0.003	ND	≤ 1.4
- Pentane					
- Benzene					
- Toluene					
- m,p-Xylene					
- o-Xylene					
- C ₈ -C ₁₆	mg/l	3510 C / 8015 D	< 0.025	ND	≤ 1.7
- n-Nonane					
- n-Decane					
- n-Dodecane					
- n-Tetradecane					
- n-Hexadecane					
- C ₁₆ -C ₃₅	mg/l	3510 C / 8015 D	< 0.050	ND	≤ 0.1
- n-Octadecane					
- n-Eicosane					
- n-Docosane					
- n-Tetracosane					
- n-Hexacosane					
- n-Octacosane					
- n-Triacontane					
- n-Dotriacontane					
- n-Tetratriacontane					
- Pentatriacontane					

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

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Analyst

REG. NO. ๖-239-๓-0001

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GROUND WATER ANALYSIS REPORT

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	(Feeder Line Project)	SAMPLING METHOD	: Pneumatic Bladder Pump
SAMPLING BY	: SECOT Co., Ltd.	SAMPLING TIME	: 10:49-10:57
SAMPLING DATE	: 07/09/2022	ANALYTICAL DATE	: 07, 08-15/09/2022
RECEIVED DATE	: 08/09/2022	SITE OPERATOR	: Mr. Baworn Deechaiya
REPORT DATE	: 21/09/2022	FILE CODE	: 222100_GW_September
SAMPLE CONDITION	: Normal		

PARAMETER	UNIT	ANALYSIS	ND	STATION
		METHODS	(non-detectable)	
Depth	m	-	-	3.00
Temperature	°C	2550 B	< 0.5	30.5
pH	-	4500-H ⁺ B	< 0.10	4.80
Color	Unit	2120 B	< 5.0	< 5
Conductivity	µS/cm	2510 B	< 1.0	4,783
Total Dissolved Solids	mg/l	2540 C	< 50	3,878
Total Suspended Solids	mg/l	2540 D	< 5	25

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

(Miss Khemchuda Insorn)

Analyst

(Mrs. Araya Tippiaruk)

Technical Management Team

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	(Feeder Line Project)	SAMPLING METHOD	: Pneumatic Bladder Pump
SAMPLING BY	: SECOT Co., Ltd.	SAMPLING TIME	: 10:49-10:57
SAMPLING DATE	: 07/09/2022	ANALYTICAL DATE	: 12-14/09/2022
RECEIVED DATE	: 08/09/2022	SITE OPERATOR	: Mr. Baworn Deechaiya
REPORT DATE	: 21/09/2022	FILE CODE	: 222100_GW_September
SAMPLE CONDITION	: Normal		

PARAMETER	UNIT	ANALYSIS	ND	STATION	STANDARD ^{1/}
		METHODS	(non-detectable)	GW-17	
Benzene	mg/l	6200 B	< 0.0002	ND	≤ 0.2
Carbon tetrachloride	mg/l	6200 B	< 0.0002	ND	≤ 0.4
1,2-Dichloroethane	mg/l	6200 B	< 0.0002	ND	≤ 0.5
Dichloromethane	mg/l	6200 B	< 0.0002	0.0004	≤ 6.0
1,1-Dichloroethylene	mg/l	6200 B	< 0.0002	ND	≤ 0.1
cis-1,2-Dichloroethylene	mg/l	6200 B	< 0.0002	ND	≤ 2.0
trans-1,2-Dichloroethylene	mg/l	6200 B	< 0.0002	ND	≤ 5.0
Ethylbenzene	mg/l	6200 B	< 0.0002	ND	≤ 2.0
Styrene	mg/l	6200 B	< 0.0002	ND	≤ 24
Tetrachloroethylene	mg/l	6200 B	< 0.0002	ND	≤ 0.9
Toluene	mg/l	6200 B	< 0.0002	ND	≤ 5.0
1,1,1-Trichloroethane	mg/l	6200 B	< 0.0002	ND	≤ 0.2
1,1,2-Trichloroethane	mg/l	6200 B	< 0.0002	ND	≤ 0.8
Trichloroethylene	mg/l	6200 B	< 0.0002	ND	≤ 4.4
m-Xylene	mg/l	6200 B	< 0.0002	ND	≤ 24
o-Xylene	mg/l	6200 B	< 0.0002	ND	≤ 24
p-Xylene	mg/l	6200 B	< 0.0002	ND	≤ 24
Total Xylenes	mg/l	6200 B	< 0.0006	ND	≤ 24
Vinyl Chloride	mg/l	6200 B	< 0.0005	ND	≤ 0.03

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

Natsiri L.

(Miss Natsiri Lertterapipat)

Analyst

REG. NO. ๖-239-ก-0001

Araya Tipparuk

(Mrs. Araya Tipparuk)

Technical Management Team

REG. NO. ๖-239-ก-5863

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 3. ^{1/} Notification of the Ministry of Industry, B.E.2559 (2016).



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SECOT CO., LTD.

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239 RIMKLONGPRAPA ROAD, BANGSUE, BANGKOK 10800, THAILAND

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

GROUND WATER ANALYSIS REPORT

CLIENT NAME	: Kuwait Petroleum Aviation (Thailand) Ltd.	REQUEST SERVICE No.	: 1825/65
	(Feeder Line Project)	SAMPLING METHOD	: Pneumatic Bladder Pump
SAMPLING BY	: SECOT Co., Ltd.	SAMPLING TIME	: 10:49-10:57
SAMPLING DATE	: 07/09/2022	ANALYTICAL DATE	: 12,16-20/09/2022
RECEIVED DATE	: 08/09/2022	SITE OPERATOR	: Mr. Baworn Deechaiya
REPORT DATE	: 21/09/2022	FILE CODE	: 222100_GW_September
SAMPLE CONDITION	: Normal		

PARAMETER	UNIT	ANALYSIS METHODS	ND (non-detectable)	STATION GW-17	STANDARD ^{1/}
Total Petroleum Hydrocarbons					
- C ₅ -C ₈	mg/l	5030 C / 8260 D	< 0.003	ND	≤ 1.4
- Pentane					
- Benzene					
- Toluene					
- m,p-Xylene					
- o-Xylene					
-C ₈ -C ₁₆	mg/l	3510 C / 8015 D	< 0.025	ND	≤ 1.7
- n-Nonane					
- n-Decane					
- n-Dodecane					
- n-Tetradecane					
- n-Hexadecane					
-C ₁₆ -C ₃₅	mg/l	3510 C / 8015 D	< 0.050	ND	≤ 0.1
- n-Octadecane					
- n-Eicosane					
- n-Docosane					
- n-Tetracosane					
- n-Hexacosane					
- n-Octacosane					
- n-Triacontane					
- n-Dotriacontane					
- n-Tetratriacontane					
- Pentatriacontane					

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

Natsiri L.

(Miss Natsiri Lertterapipat)

Analyst

REG. NO. ๖-239-ท-0001

(Mrs. Araya Tippiaruk)

Technical Management Team

REG. NO. ๖-239-ท-5863

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GROUND WATER ANALYSIS REPORT

CLIENT NAME	: Kuwait Petroleum Aviation (Thailand) Ltd.	REQUEST SERVICE No.	: 1825/65
	(Feeder Line Project)	SAMPLING METHOD	: Pneumatic Bladder Pump
SAMPLING BY	: SECOT Co., Ltd.	SAMPLING TIME	: 12:17
SAMPLING DATE	: 07/09/2022	ANALYTICAL DATE	: 07, 08-15/09/2022
RECEIVED DATE	: 08/09/2022	SITE OPERATOR	: Mr. Baworn Deechaiya
REPORT DATE	: 21/09/2022	FILE CODE	: 222100_GW_September
SAMPLE CONDITION	: Normal		

PARAMETER	UNIT	ANALYSIS	ND (non-detectable)	STATION
		METHODS		บ่อน้ำบาดาลบริเวณชุมชนบ้านทุ่ง
Temperature	°C	2550 B	< 0.5	28.9
pH	-	4500-H ⁺ B	< 0.10	6.78
Color	Unit	2120 B	< 5.0	< 5
Conductivity	µS/cm	2510 B	< 1.0	963
Total Dissolved Solids	mg/l	2540 C	< 50	568
Total Suspended Solids	mg/l	2540 D	< 5	< 5

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

(Miss Khemchuda Insorn)

Analyst

(Mrs. Araya Tippiaruk)

Technical Management Team

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3. - Not available.



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GROUND WATER ANALYSIS REPORT

CLIENT NAME	: Kuwait Petroleum Aviation (Thailand) Ltd.	REQUEST SERVICE No.	: 1825/65
	(Feeder Line Project)	SAMPLING METHOD	: Pneumatic Bladder Pump
SAMPLING BY	: SECOT Co., Ltd.	SAMPLING TIME	: 12:17
SAMPLING DATE	: 07/09/2022	ANALYTICAL DATE	: 12-14/09/2022
RECEIVED DATE	: 08/09/2022	SITE OPERATOR	: Mr. Baworn Deechaiya
REPORT DATE	: 21/09/2022	FILE CODE	: 222100_GW_September
SAMPLE CONDITION	: Normal		

PARAMETER	UNIT	ANALYSIS	ND	STATION	STANDARD ^{1/}
		METHODS	(non-detectable)	บ่อน้ำบาดาลบริเวณชุมชนบ้านทุ่ง	
Benzene	mg/l	6200 B	< 0.0002	ND	≤ 0.2
Carbon tetrachloride	mg/l	6200 B	< 0.0002	ND	≤ 0.4
1,2-Dichloroethane	mg/l	6200 B	< 0.0002	ND	≤ 0.5
Dichloromethane	mg/l	6200 B	< 0.0002	0.0021	≤ 6.0
1,1-Dichloroethylene	mg/l	6200 B	< 0.0002	ND	≤ 0.1
cis-1,2-Dichloroethylene	mg/l	6200 B	< 0.0002	ND	≤ 2.0
trans-1,2-Dichloroethylene	mg/l	6200 B	< 0.0002	ND	≤ 5.0
Ethylbenzene	mg/l	6200 B	< 0.0002	ND	≤ 2.0
Styrene	mg/l	6200 B	< 0.0002	ND	≤ 24
Tetrachloroethylene	mg/l	6200 B	< 0.0002	ND	≤ 0.9
Toluene	mg/l	6200 B	< 0.0002	ND	≤ 5.0
1,1,1-Trichloroethane	mg/l	6200 B	< 0.0002	ND	≤ 0.2
1,1,2-Trichloroethane	mg/l	6200 B	< 0.0002	ND	≤ 0.8
Trichloroethylene	mg/l	6200 B	< 0.0002	ND	≤ 4.4
m-Xylene	mg/l	6200 B	< 0.0002	ND	≤ 24
o-Xylene	mg/l	6200 B	< 0.0002	ND	≤ 24
p-Xylene	mg/l	6200 B	< 0.0002	ND	≤ 24
Total Xylenes	mg/l	6200 B	< 0.0006	ND	≤ 24
Vinyl Chloride	mg/l	6200 B	< 0.0005	ND	≤ 0.03

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

Natsiri L.

(Miss Natsiri Lertterapipat)

Analyst

REG. NO. ว-239-ค-0001

(Mrs. Araya Tipparuk)

Technical Management Team

REG. NO. ว-239-ค-5863

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GROUND WATER ANALYSIS REPORT

CLIENT NAME	: Kuwait Petroleum Aviation (Thailand) Ltd.	REQUEST SERVICE No.	: 1825/65
	(Feeder Line Project)	SAMPLING METHOD	: Pneumatic Bladder Pump
SAMPLING BY	: SECOT Co., Ltd.	SAMPLING TIME	: 12:17
SAMPLING DATE	: 07/09/2022	ANALYTICAL DATE	: 12,16-20/09/2022
RECEIVED DATE	: 08/09/2022	SITE OPERATOR	: Mr. Baworn Deechaiya
REPORT DATE	: 21/09/2022	FILE CODE	: 222100_GW_September
SAMPLE CONDITION	: Normal		

PARAMETER	UNIT	ANALYSIS METHODS	ND (non-detectable)	STATION บ่อน้ำบาดาลบริเวณชุมชนบ้านทุ่ง	STANDARD ^{1/}
Total Petroleum Hydrocarbons					
- C ₅ -C ₈	mg/l	5030 C / 8260 D	< 0.003	ND	≤ 1.4
- Pentane					
- Benzene					
- Toluene					
- m,p-Xylene					
- o-Xylene					
- C ₉ -C ₁₆	mg/l	3510 C / 8015 D	< 0.025	ND	≤ 1.7
- n-Nonane					
- n-Decane					
- n-Dodecane					
- n-Tetradecane					
- n-Hexadecane					
- C ₁₇ -C ₃₅	mg/l	3510 C / 8015 D	< 0.050	ND	≤ 0.1
- n-Octadecane					
- n-Eicosane					
- n-Docosane					
- n-Tetracosane					
- n-Hexacosane					
- n-Octacosane					
- n-Triacontane					
- n-Dotriacontane					
- n-Tetratriacontane					
- Pentatriacontane					

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

Natsiri L.

(Miss Natsiri Lertterapipat)

Analyst

REG. NO. ว-239-ท-0001

(Mrs. Araya Tipparuk)

Technical Management Team

REG. NO. ว-239-ท-5863

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GROUND WATER ANALYSIS REPORT

CLIENT NAME	: Kuwait Petroleum Aviation (Thailand) Ltd.	REQUEST SERVICE No.	: 1825/65
	(Feeder Line Project)	SAMPLING METHOD	: Pneumatic Bladder Pump
SAMPLING BY	: SECOT Co., Ltd.	SAMPLING TIME	: 12:30
SAMPLING DATE	: 07/09/2022	ANALYTICAL DATE	: 07, 08-15/09/2022
RECEIVED DATE	: 08/09/2022	SITE OPERATOR	: Mr. Baworn Deechaiya
REPORT DATE	: 21/09/2022	FILE CODE	: 222100_GW_September
SAMPLE CONDITION	: Normal		

PARAMETER	UNIT	ANALYSIS	ND	STATION
		METHODS	(non-detectable)	บ่อน้ำบาดาลบริเวณวัดใหม่เนินพยอม
Temperature	°C	2550 B	< 0.5	27.8
pH	-	4500-H ⁺ B	< 0.10	6.84
Color	Unit	2120 B	< 5.0	5
Conductivity	µS/cm	2510 B	< 1.0	939
Total Dissolved Solids	mg/l	2540 C	< 50	584
Total Suspended Solids	mg/l	2540 D	< 5	< 5

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

(Miss Khemchuda Insorn)

Analyst

(Mrs. Araya Tipparuk)

Technical Management Team

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 3. - Not available.



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SAMPLE CONDITION	: Normal		

PARAMETER	UNIT	ANALYSIS	ND	STATION	STANDARD ^{1/}
		METHODS	(non-detectable)	บ่อน้ำบาดาลบริเวณวัดใหม่เนินพยอม	
Benzene	mg/l	6200 B	< 0.0002	ND	≤ 0.2
Carbon tetrachloride	mg/l	6200 B	< 0.0002	ND	≤ 0.4
1,2-Dichloroethane	mg/l	6200 B	< 0.0002	ND	≤ 0.5
Dichloromethane	mg/l	6200 B	< 0.0002	0.0006	≤ 6.0
1,1-Dichloroethylene	mg/l	6200 B	< 0.0002	ND	≤ 0.1
cis-1,2-Dichloroethylene	mg/l	6200 B	< 0.0002	ND	≤ 2.0
trans-1,2-Dichloroethylene	mg/l	6200 B	< 0.0002	ND	≤ 5.0
Ethylbenzene	mg/l	6200 B	< 0.0002	ND	≤ 2.0
Styrene	mg/l	6200 B	< 0.0002	ND	≤ 24
Tetrachloroethylene	mg/l	6200 B	< 0.0002	ND	≤ 0.9
Toluene	mg/l	6200 B	< 0.0002	ND	≤ 5.0
1,1,1-Trichloroethane	mg/l	6200 B	< 0.0002	ND	≤ 0.2
1,1,2-Trichloroethane	mg/l	6200 B	< 0.0002	ND	≤ 0.8
Trichloroethylene	mg/l	6200 B	< 0.0002	ND	≤ 4.4
m-Xylene	mg/l	6200 B	< 0.0002	ND	≤ 24
o-Xylene	mg/l	6200 B	< 0.0002	ND	≤ 24
p-Xylene	mg/l	6200 B	< 0.0002	ND	≤ 24
Total Xylenes	mg/l	6200 B	< 0.0006	ND	≤ 24
Vinyl Chloride	mg/l	6200 B	< 0.0005	ND	≤ 0.03

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

Natsiri L.

(Miss Natsiri Lertterapipat)

Analyst

REG. NO. ๖-239-๓-0001

(Mrs. Araya Tipparuk)

Technical Management Team

REG. NO. ๖-239-๓-5863

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SAMPLE CONDITION	: Normal		

PARAMETER	UNIT	ANALYSIS METHODS	ND (non-detectable)	STATION บ่อน้ำบาดาลบริเวณวัดใหม่เนินพยอม	STANDARD ^{1/}
Total Petroleum Hydrocarbons					
- C ₅ -C ₈	mg/l	5030 C / 8260 D	< 0.003	ND	≤ 1.4
- Pentane					
- Benzene					
- Toluene					
- m,p-Xylene					
- o-Xylene					
- C ₈ -C ₁₆	mg/l	3510 C / 8015 D	< 0.025	ND	≤ 1.7
- n-Nonane					
- n-Decane					
- n-Dodecane					
- n-Tetradecane					
- n-Hexadecane					
- C ₁₆ -C ₃₅	mg/l	3510 C / 8015 D	< 0.050	ND	≤ 0.1
- n-Octadecane					
- n-Eicosane					
- n-Docosane					
- n-Tetracosane					
- n-Hexacosane					
- n-Octacosane					
- n-Triacontane					
- n-Dotriacontane					
- n-Tetratriacontane					
- Pentatriacontane					

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

Natsiri L.
(Miss Natsiri Lertterapipat)

Analyst

REG. NO. ๖-239-ก-0001

(Mrs. Araya Tipparak)

Technical Management Team

REG. NO. ๖-239-ก-5863

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ภาคผนวก ง

ใบแสดงการตรวจเทียบเครื่องมือตรวจวัดและวิเคราะห์



Certificate of Calibration

Certificate No. : 65-420016-1

Page : 1 of 2

Submitted by : Secot Co.,Ltd.

239 RimKlongprapa Road, Bangsue, Bangkok 10800 Thailand

Equipment : pH Meter with electrode

pH meter

Manufacturer : Mettler Toledo Model : Seven2Go S2

Range : N/A pH Resolution : 0.01 pH

Serial No. : B924795409 ID No. : N/A

Electrode

Model : InLab Expert Go-ISM Serial No. : 7861180

Environment : Ambient Temperature : (25 ± 2) °C

Relative Humidity : (50 ± 15) %

Date of Received : 15 February 2022

Date of Calibration : 24 February 2022

Date of Issue : 24 February 2022

Calibrated by : Bunjerd Mastri

Calibration Method : In-house method CAL-M4201 direct measurement by using standard voltage calibrator

and using certified reference material (CRM)

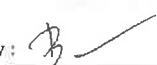
Reference Standard Instruments : This certification is traceable to the International System of Units

1. Multiproduct Calibrator

ID No.	Cert. No.	Due Date	Traceability
440001	21E997	17 Mar 2023	National Institute of Metrology Thailand (NIMT)

2. Standard Buffer Solution

pH	Cert. No.	Lot No.	Exp. Date	Traceability
4.008	61235182	795894	14 Feb 2024	CPA Chem Ltd. Accredited to ISO 17034 and ISO/IEC 17025
6.985	61223875	769927	15 May 2022	CPA Chem Ltd. Accredited to ISO 17034 and ISO/IEC 17025
10.008	61244986	795895	25 Feb 2023	CPA Chem Ltd. Accredited to ISO 17034 and ISO/IEC 17025

Approved by : 
(Bunjerd Mastri)
Supervisor

The Uncertainties are for a confidence probability of approximately 95%

This certificate may not be reproduced other than in full except with the prior written approval of the Calibratech Co.,Ltd.



Certificate of Calibration

Certificate No. : 65-420016-1

Page : 2 of 2

Result of Calibration :

UUC Condition As-Received : Good

Function : Electrical measurement

pH meter

Performing standard curve by Multiproduct Calibrator at pH (4,7,10)

Adjustment Curve at nominal pH	Applied Voltage (mV)	Nominal Value (pH)	UUC Reading		Correction (mV)	Uncertainty (± mV)
			(pH)	(mV)		
4, 7, 10	177.4800	4	4.00	177	0	0.58
	0.0000	7	7.00	0	0	0.58
	-177.4800	10	10.00	-177	0	0.58

Function : pH meter with electrode

Performing a three - buffer standard curve using buffer nominal pH (4,7,10)

Adjustment Curve at nominal pH	Standard Buffer (pH)	UUC Reading (pH)	Correction (pH)	Uncertainty (± pH)
4, 7, 10	4.008	4.01	0.00	0.010
	6.985	7.00	-0.01	0.011
	10.008	10.01	0.00	0.014

Remark

UUC : Unit Under Calibration

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

This reported uncertainty of measurement was based on a standard uncertainty multiplied by a coverage factor k = 2 ,
providing a level of confidence of approximately 95%

- oOo -





CAL

Calibratech Co.,Ltd.

7/106-7 Moo 2, Sukhprachasan 3 Rd., Bangpood, Pakkred, Nonthaburi 11120

Tel.(02) 964-6211 Fax.(02) 964-5155, e-mail : calibratech.cal@yahoo.com, calibratech.cal@hotmail.com



Certificate of Calibration

Certificate No. : 65-400086-1

Page : 1 of 2

Submitted by : Secot Co.,Ltd.

239 RimKlongprapa Road, Bangsue, Bangkok 10800 Thailand

Equipment : Digital Thermometer with Thermistor Probe

Temperature Indicator

Manufacturer : Mettler Toledo

Model : Seven2Go S2

Range : N/A

Resolution : 0.1 °C

Serial No. : B924795409

ID No. : N/A

Thermistor Probe

Model : InLab Expert Go-ISM

Sheath Material : Plastic

Diameter : 10 mm.

Length : 120 mm.

Serial No. : 7861180

ID No. : N/A

Environment : Ambient Temperature : (23 ± 2) °C

Relative Humidity : (50 ± 15) %

Line Voltage : (220 ± 22) VAC

Date of Received : 15 February 2022

Date of Calibration : 24 February 2022

Date of Issue : 24 February 2022

Calibrated by : Bunjerd Masri

Calibration Method : This instrument was calibrated by In-house method comparison technique CAL-M4003 by compared with PRT in the liquid bath at the constant controlled temperature.

The temperature scale used was based on ITS-90

Reference Standard Instruments : This certification is traceable to the International System of Units

1. Platinum Resistance Thermometer (PRT)

ID No.	Cert. No.	Due Date	Traceability
400016	TT-0059-21	02 Jun 2023	National Institute of Metrology Thailand (NIMT)

2. Standard Digital Thermometer

ID No.	Cert. No.	Due Date	Traceability
400003	21E1850	14 Jun 2023	National Institute of Metrology Thailand (NIMT)
400004	21E1850	14 Jun 2023	National Institute of Metrology Thailand (NIMT)

Approved by :

(Bunjerd Masri)

Supervisor

The Uncertainties are for a confidence probability of approximately 95%

This certificate may not be reproduced other than in full except with the prior written approval of the Calibratech Co.,Ltd.

CAL-F0031-03



CAL

Calibratech Co.,Ltd.

7/106-7 Moo 2, Sukhprachasan 3 Rd., Bangpood, Pakkred, Nonthaburi 11120

Tel.(02) 964-6211 Fax.(02) 964-5155, e-mail : calibratech.cal@yahoo.com, calibratech.cal@hotmail.com

Certificate of Calibration

Certificate No. : 65-400086-1

Page : 2 of 2

Result of Calibration : Without Adjustment

UUC Condition As-Received : Good

Function : Temperature measurement

Immersion Depth (mm.)	Standard Reading (°C)	UUC Reading (°C)	Correction (°C)	Uncertainty (± °C)
100	25.0042	25.0	0.0	0.12
100	30.0036	30.0	0.0	0.12
100	35.0050	35.0	0.0	0.12

Remark

UUC : Unit Under Calibration

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

This reported uncertainty of measurement was based on a standard uncertainty multiplied by a coverage factor k = 2 , providing a level of confidence of approximately 95%

- 0(0) -

B

CAL-F0031-03





TECHNOLOGY PROMOTION ASSOCIATION (THAILAND-JAPAN)
CORPORATE SERVICES 3: EQUIPMENT CALIBRATION AND TESTING SERVICES
534/4 PATTANAKARN ROAD SOI 18, SUANLUANG, SUANLUANG BANGKOK 10250
TEL. 0-2717-3000-27 FAX. 0-2719-9484



Cert.No.: 21CH1690
Page.: 1 of 2

Certificate of Calibration

Equipment : Conductivity Meter
Manufacturer : Hanna
Model : HI98192
Serial No. : 05200045101
ID No. : -
Condition As-Received: Used Item
Received Date : 07 December 2021
Calibration Date : 13 December 2021
Reference : 2112-0144DN-2
Submitted by : Secot Co.,Ltd.
239 Rimklongprapa Road,
Bangsue, Bangkok 10800
Ambient Temperature : (25 \pm 2.5) °C
Relative Humidity : (50 \pm 15) %
Calibration Procedure: In-house method :
- CP-CH6 : based on direct measurement by
using certified reference material (CRM)
Calibrated by : Walalak Sirithean
Approved by :
(/) Malee Butkruea
() Saithip Meangmai
() Warakorn Lernagtrakul
Issue Date : 15 December 2021

The Uncertainties are for a confidence probability of approximately 95 %

This certificate may not be reproduced other than in full, except with the prior written
Approval of the head of Corporate Services 3 : Equipment Calibration and Testing Services.

A 0035796



Cert.No.: 21CH1690
Page.: 2 of 2

Condition of this result of calibration

1. Reference Standard Instrument :-

Instrument	Serial No.	ID No.	Certificate No.	Due date
1) Thermometer	9549224	130RC003	21I451	15 Apr 2022

This certification is traceable to the International System of Unit maintained at:-

- Traceable to National Institute of Metrology (Thailand), NIMT

2. Certified Reference Materials :-

- Conductivity calibration solution, CPA chem Ltd., The measurement results are traceable to SI through CPA chem Ltd., ANSI-ASQ National Accreditation Board, Accredited No. AR-1835
- Conductivity calibration solution, Thermo Scientific (traceable to NIST)

Conductivity Solution	Manufacturer	Lot No.	Exp. date
*100 μ S/cm	Thermo Scientific	101/04	12 Mar 2022
1.413 mS/cm	CPA Chem	761021	02 Aug 2022
12.8806 mS/cm	CPA Chem	754037	28 June 2022

- Control Conductivity calibration solution temperature by Water bath (25 \pm 0.1) °C

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

Calibration results

Function : Conductivity Measurement

(*) After Adjustment at 1.413, 12.8806 mS/cm
Conductivity Electrode Serial No.: 0720001N

Standard Conductivity Solution	Before Adjustment UUC* Reading	After Adjustment UUC* Reading	Uncertainty of Measurement (\pm)	Coverage factor k
*100 μ S/cm	95.42 μ S/cm	99.93 μ S/cm	5.1 μ S/cm	2.00
1.413 mS/cm	1.198 mS/cm	1.412 mS/cm	0.0092 mS/cm	2.00
12.8806 mS/cm	12.49 mS/cm	12.87 mS/cm	0.086 mS/cm	2.00

Remark - UUC* = Unit Under Calibration
- * : Not NSC - ONSC Accredited

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

-o0o-

a 1086390

Calibration Certificate

Certificate No.: 2203876-003-01
Client name: SECOT CO., LTD.
Address: 239 Rimklongprapa Road,
 Bangsue, Bangsue, Bangkok 10800

Page 1 of 3

Equipment: Water Bath
Manufacturer: MEMMERT
Model: WB 29
Serial No.: I698.0051
ID No.: N/A
Order No.: 2203876
Operation No.: 2203876-003
Date of Receipt: 1 August 2022
Date of Calibration: 1 August 2022

Calibrated by Mr.Yothin Charoensuk
 Scientist

Approved by


 (Mr.Pheraphat Tuanjit) (for)
 Manager, Division of Calibration Laboratory
 Responsible for the Technical Management Team

Date of Issue: 3 August 2022

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

This Certificate is issued in accordance with the conditions of accreditation granted by the Thai Laboratory Accreditation scheme which has assessed the measurement capability of the laboratory and its traceability to recognized national standards and to the units of measurement realized at the corresponding national standards laboratory. This certificate may not be reproduced other than in full except with the prior written approval of the National Food Institute.

F-CS-009 Revision: 01 Date: 20-04-65



nfi.co.th

Calibration Report

Certificate No.: 2203876-003-01
Equipment: Water Bath
 Model: WB 29 Serial No.: I698.0051
 Resolution: 0.1 °C ID No.: N/A
 Manufacturer: MEMMERT

Date of Calibration: 1 August 2022

Page 2 of 3

Location: Laboratory, SECOT CO., LTD.
Environment Condition:
 Ambient Temperature (29 ± 1) °C
 Relative Humidity (66 ± 5) %
 Line Voltage (224 ± 1) Volt

Condition of this results of Calibration:


- This instrument was calibrated by insert 5 standard thermometer into its liquid bath and calibration according to W-TE-011 based on ASTM E715-80 (2016): Standard Specification for Gravity-Convection and Forced-Circulation Water Baths.
 - The temperature scale used is ITS - 90.
 - All data show below were final values and the initial data may be obtained upon request.

2. Reference Standard Instrument :

Instrument	Model	Serial No./ID No.	Certificate No.	Due Date	Through
Digital Thermometer with sensor	34972A	MY57003188	TE 650469-01	11 June 2023	NATIONAL FOOD INSTITUTE
	RTD	RTD#301-305 / CH#301-305			

- This certificate is traceable to International System of Units (SI Units).
- This certificate was certified only for the instrument we calibrated.
- This result of calibration was found accurate as shown on date and place of calibration only.
- Condition of Calibrated item : Good
 UUC Description:

Time of Record 1 Hour 9 Minute At 95.0 °C
 7. Result of Calibration : ☒ Without adjustment
☐ After adjustment


 3 Aug. 2022

F-CS-012 Revision: 01 Date: 20-04-65



nfi.co.th

Calibration Report

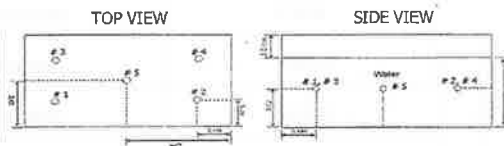
Certificate No.:	2203876-003-01		
Equipment:	Water Bath		
	Model: WB 29	Serial No.:	I698.0051
	Resolution: 0.1 °C	ID No.:	N/A
	Manufacturer: MEMMERT		
Date of Calibration:	1 August 2022		

Page 3 of 3

Calibration point: 95,0 °C

Calibration result:

Calibration Condition	Temperature (°C)	Relative Humidity (%)	Line Voltage (Volt)
Min	28.2	61	223.0
Max	29.7	71	225.0



Sensor Installation Location

Table1 : Reporting of Temperature

Calibration Point (°C)	Measured Temperature (°C) @ Sensor No. (Sensor No.5 is REF)					Uncertainty ± (°C)
	# 1	# 2	# 3	# 4	# 5	
95.0	95.08	95.09	95.03	94.94	94.99	0.38

Table 2 : Reporting of Characterization Result

UUC* Setting (°C)	UUC* reading (°C)			Stability ± (°C)	Uniformity (°C)	Overall Variation (°C)
	MIN	MAX	Average			
95.0	94.9	95.1	95.0	0.25	0.10	0.69

Note The quoted uncertainty include " Stability " and " Loading effect (20% of Temp Uniformity)"

UUC[®] = Unit Under Calibration

Stability = One-half of the greatest maximum difference of measured temperatures at any one sensors, for at least half an hour after reaching steady state.

Uniformity = The maximum difference of measured temperatures at any sensors and the measured temperature at the reference location which are observed at the same time.

Overall Variation = The difference of the maximum and minimum measured temperatures throughout observation time.

The report uncertainty of measurement was based on standard uncertainty multiplied by coverage factor $k = 2$, providing a level of confidence of approximately 95 %.

End

FCS-012 Revision: 01 Date: 20-04-65

2008, 2009, 2010, 2011, 2012, 2013, 2014, 2015, 2016, 2017, 2018, 2019, 2020, 2021, 2022, 2023, 2024, 2025, 2026, 2027, 2028, 2029, 2030, 2031, 2032, 2033, 2034, 2035, 2036, 2037, 2038, 2039, 2040, 2041, 2042, 2043, 2044, 2045, 2046, 2047, 2048, 2049, 2050, 2051, 2052, 2053, 2054, 2055, 2056, 2057, 2058, 2059, 2060, 2061, 2062, 2063, 2064, 2065, 2066, 2067, 2068, 2069, 2070, 2071, 2072, 2073, 2074, 2075, 2076, 2077, 2078, 2079, 2080, 2081, 2082, 2083, 2084, 2085, 2086, 2087, 2088, 2089, 2090, 2091, 2092, 2093, 2094, 2095, 2096, 2097, 2098, 2099, 2100, 2101, 2102, 2103, 2104, 2105, 2106, 2107, 2108, 2109, 2110, 2111, 2112, 2113, 2114, 2115, 2116, 2117, 2118, 2119, 2120, 2121, 2122, 2123, 2124, 2125, 2126, 2127, 2128, 2129, 2130, 2131, 2132, 2133, 2134, 2135, 2136, 2137, 2138, 2139, 2140, 2141, 2142, 2143, 2144, 2145, 2146, 2147, 2148, 2149, 2150, 2151, 2152, 2153, 2154, 2155, 2156, 2157, 2158, 2159, 2160, 2161, 2162, 2163, 2164, 2165, 2166, 2167, 2168, 2169, 2170, 2171, 2172, 2173, 2174, 2175, 2176, 2177, 2178, 2179, 2180, 2181, 2182, 2183, 2184, 2185, 2186, 2187, 2188, 2189, 2190, 2191, 2192, 2193, 2194, 2195, 2196, 2197, 2198, 2199, 2200, 2201, 2202, 2203, 2204, 2205, 2206, 2207, 2208, 2209, 2210, 2211, 2212, 2213, 2214, 2215, 2216, 2217, 2218, 2219, 2220, 2221, 2222, 2223, 2224, 2225, 2226, 2227, 2228, 2229, 2230, 2231, 2232, 2233, 2234, 2235, 2236, 2237, 2238, 2239, 2240, 2241, 2242, 2243, 2244, 2245, 2246, 2247, 2248, 2249, 2250, 2251, 2252, 2253, 2254, 2255, 2256, 2257, 2258, 2259, 2260, 2261, 2262, 2263, 2264, 2265, 2266, 2267, 2268, 2269, 2270, 2271, 2272, 2273, 2274, 2275, 2276, 2277, 2278, 2279, 2280, 2281, 2282, 2283, 2284, 2285, 2286, 2287, 2288, 2289, 2290, 2291, 2292, 2293, 2294, 2295, 2296, 2297, 2298, 2299, 2300, 2301, 2302, 2303, 2304, 2305, 2306, 2307, 2308, 2309, 2310, 2311, 2312, 2313, 2314, 2315, 2316, 2317, 2318, 2319, 2320, 2321, 2322, 2323, 2324, 2325, 2326, 2327, 2328, 2329, 2330, 2331, 2332, 2333, 2334, 2335, 2336, 2337, 2338, 2339, 2340, 2341, 2342, 2343, 2344, 2345, 2346, 2347, 2348, 2349, 2350, 2351, 2352, 2353, 2354, 2355, 2356, 2357, 2358, 2359, 2360, 2361, 2362, 2363, 2364, 2365, 2366, 2367, 2368, 2369, 2370, 2371, 2372, 2373, 2374, 2375, 2376, 2377, 2378, 2379, 2380, 2381, 2382, 2383, 2384, 2385, 2386, 2387, 2388, 2389, 2390, 2391, 2392, 2393, 2394, 2395, 2396, 2397, 2398, 2399, 2400, 2401, 2402, 2403, 2404, 2405, 2406, 2407, 2408, 2409, 2410, 2411, 2412, 2413, 2414, 2415, 2416, 2417, 2418, 2419, 2420, 2421, 2422, 2423, 2424, 2425, 2426, 2427, 2428, 2429, 2430, 2431, 2432, 2433, 2434, 2435, 2436, 2437, 2438, 2439, 2440, 2441, 2442, 2443, 2444, 2445, 2446, 2447, 2448, 2449, 2450, 2451, 2452, 2453, 2454, 2455, 2456, 2457, 2458, 2459, 2460, 2461, 2462, 2463, 2464, 2465, 2466, 2467, 2468, 2469, 2470, 2471, 2472, 2473, 2474, 2475, 2476, 2477, 2478, 2479, 2480, 2481, 2482, 2483, 2484, 2485, 2486, 2487, 2488, 2489, 2490, 2491, 2492, 2493, 2494, 2495, 2496, 2497, 2498, 2499, 2500, 2501, 2502, 2503, 2504, 2505, 2506, 2507, 2508, 2509, 2510, 2511, 2512, 2513, 2514, 2515, 2516, 2517, 2518, 2519, 2520, 2521, 2522, 2523, 2524, 2525, 2526, 2527, 2528, 2529, 2530, 2531, 2532, 2533, 2534, 2535, 2536, 2537, 2538, 2539, 2540, 2541, 2542, 2543, 2544, 2545, 2546, 2547, 2548, 2549, 2550, 2551, 2552, 2553, 2554, 2555, 2556, 2557, 2558, 2559, 2560, 2561, 2562, 2563, 2564, 2565, 2566, 2567, 2568, 2569, 2570, 2571, 2572, 2573, 2574, 2575, 2576, 2577, 2578, 2579, 2580, 2581, 2582, 2583, 2584, 2585, 2586, 2587, 2588, 2589, 2590, 2591, 2592, 2593, 2594, 2595, 2596, 2597, 2598, 2599, 2600, 2601, 2602, 2603, 2604, 2605, 2606, 2607, 2608, 2609, 2610, 2611, 2612, 2613, 2614, 2615, 2616, 2617, 2618, 2619, 2620, 2621, 2622, 2623, 2624, 2625, 2626, 2627, 2628, 2629, 2630, 2631, 2632, 2633, 2634, 2635, 2636, 2637, 2638, 2639, 2640, 2641, 2642, 2643, 2644, 2645, 2646, 2647, 2648, 2649, 2650, 2651, 2652, 2653, 2654, 2655, 2656, 2657, 2658, 2659, 2660, 2661, 2662, 2663, 2664, 2665, 2666, 2667, 2668, 2669, 2670, 2671, 2672, 2673, 2674, 2675, 2676, 2677, 2678, 2679, 2680, 2681, 2682, 2683, 2684, 2685, 2686, 2687, 2688, 2689, 26



Request Service No. 098/65

Page 1 of 3

Calibration Certificate

Nomenclature : Brand : Mettler Toledo Type : Top-Loading Electronic Balance

Model : AG245 Serial No. : 1117293916 (198129-0)

Submitted by : Laboratory of SECOT CO., LTD.

Location of Calibration : BAL Room , 6th Floor, Secot Co., Ltd.

Calibration range : 0 – 200 g Scale division : 0.00001 g (41g) / 0.0001 g (210g)

Calibration date : May 26,2022

Reference Standard No. M2110188S, M210183, M220177

Traceable to : Metrological Center SCI ECO Services Co., Ltd, THAI CALIBRATION SERVICES Co., Ltd

Ambient Condition : Temperature 24.28 – 24.42 °C

Humidity	48.10 – 50.90	% RH
----------	---------------	------

Calibrated By : Sasipa Jaidee Approved By : [Signature]

(Miss Sasipa Jaidee)

(Miss Siripa Jhannong)

Testing Officer

Chief of Technical Management

Date : 26/05/2022

Date: 26/05/2022

Issued Date : May 27,2022

Measurement Report

Request Service No. 098/65

Page 2 of 3

Description: Brand : Mettler Toledo Type : Top-Loading Electronic Balance
Model : AG245 Serial No. : 1117293916 (198129-0)
Calibration range : 0 – 200 g Scale division : 0.00001 g (41g) / 0.0001 g (210g)
Calibration date : May 26, 2022
Ambient Condition : Temperature 24.28 – 24.42 °C Relative humidity 48.10 – 50.90 % RH

Measurement data :

1. Repeatability of Reading :

Load (g)	Standard Deviation of Reading (g)	Maximum Difference between Successive Reading (g)
50	0.000047	0.0002
100	0.000067	0.0002
150	0.000048	0.0001
200	0.000052	0.0001

2. Off-Center Loading :

A Mass of 50.0000 g was placed and moved to various position on the pan.

Unit : g

Center	Front	Left	Back	Right	Center	Maximum Difference
50.00020	50.00046	50.00030	50.00000	50.00010	50.00020	0.00026

Issued Date : May 27, 2022

Request Service No.098/65

Page 3 of 3

3. Departure from Nominal Value :

Reading (g)	Correction (g)	Uncertainty (+/- g)
0	0.000000	± 0.000008
0.5	0.000005	± 0.000014
1	-0.000014	± 0.000018
10	-0.000071	± 0.000034
20	-0.000091	± 0.000047
40	-0.000151	± 0.000074
60	-0.00030	± 0.00012
80	-0.00021	± 0.00014
100	-0.00038	± 0.00016
120	-0.00041	± 0.00018
140	-0.00048	± 0.00021
160	-0.00050	± 0.00023
180	-0.00067	± 0.00025
200	-0.00124	± 0.00027

Calibrated by : Sasipa Jaidee Approved By : 

(Miss Sasipa Jaidee)

(Miss Siripa Jhannong)

Testing Officer

Chief of Technical Management

Date : 25/05/2022

Date : 26/05/2022

Issued Date : May 27, 2022

Agilent CrossLab Start Up Services Agilent 7890 Gas Chromatograph Preventive Maintenance Checklist

Agilent Preventive Maintenance provides factory recommended service for your analytical instruments to assure reliable operation and the accuracy of your results.

Delivered by highly trained and certified service engineers using genuine Agilent parts and supplies, Agilent Preventive Maintenance provides everything you need to reduce unplanned downtime and keep your systems operating at their peak. This checklist will be completed at the end of the service and provided to you as a record of the preventive maintenance activities.



Introduction

Customer Information

- Customers should provide all necessary operating supplies upon request of the engineer.
- A customer representative should be available to the engineer while performing the preventive maintenance procedures.
- Any parts, not included in the Parts Lists section of this document, are not part of the recommended Preventive Maintenance service, nor are they included in the price of this service.
- If a system requires the use of extra or special procedures and/or parts for the maintenance service, then these must be ordered separately and charged as a repair, which may incur additional costs.

Important Customer Web Links

- For more information about Agilent Technologies services, please visit our website using the following URL: <http://www.agilent.com/en-us/products/crosslab-instrument-services/service-repair>
- The Agilent Community is an excellent place to get answers, collaborate with others about applications and Agilent products, and find in-depth documents and videos relevant to Agilent technologies. Visit <https://community.agilent.com/welcome>.
- To access Agilent University, visit <http://www.agilent.com/crosslab/university/> to learn about training options, which include online, classroom and onsite delivery. A training specialist can work directly with you to help determine your best options.
- A useful Agilent Resource Center web page is available, which includes short videos on maintenance, quick lists of consumables for new instruments, and other valuable information. Check out the Resource Page here: <https://www.agilent.com/en-us/agilentresources>.
- Need technical support, FAQs, supplies? - visit our Support Home page <http://www.agilent.com/search/support>.
- Videos about specific preparation requirements for your instrument can be found by searching the Agilent YouTube channel at <https://www.youtube.com/user/agilent>.
- 7890B Manuals are also available on Agilent.com:
 - Safety https://www.agilent.com/cs/library/usermanuals/public/7890B_Safety.pdf
 - Installation and First Startup https://www.agilent.com/cs/library/usermanuals/public/7890B_Installation.pdf
 - Operation Manual https://www.agilent.com/cs/library/usermanuals/public/7890B_Operation.pdf
 - Maintaining Your GC https://www.agilent.com/cs/library/usermanuals/public/G3430-90052%207890B_Maintaining%20GC.pdf

Revision: 2.01, Issued: September 15, 2021
Agile Document Number: D0013618
DE number: 44166.759722222
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Service Engineer's Responsibilities

- Contact the customer and ensure that all necessary supplies are available before the preventive maintenance visit.
- Only select those pages that relate to the system or module being serviced.
- Complete empty fields with the relevant information.
- Complete the relevant checkboxes in the checklist using either a "X" or tick mark "✓".
- Check "Section not applicable" check boxes to indicate services/tasks not delivered, as appropriate.
- Complete the Preventive Maintenance service in the order of the tasks listed.
- Complete the Service Review section together with the customer.
- Complete the fields for page numbers at the foot of each selected page
- Complete the total number of pages field in the Service Completion section
- Ask the customer to sign the Service Completion section including the customer's and your signature.

Additional Instruction Notes

- Check for any active service notes for this unit. If there are any applicable "Safety" or "Modification Recommended" Service notes, plan to implement the changes on this unit before doing any qualification service.
- Do not implement firmware updates, unless you get approval from the customer and are sure that they are compatible with the instrument control software.

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Agile Document Number: D0013618
DE number: 44166.759722222
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System Information

- ☐ Check this box if an instrument configuration report is attached instead of completing the table below.

Instrument System Name and ID		CN13201093
Instrument System Site and Location		SECOT, Bangkok
List System Component Product Numbers	List the Serial Numbers of each Component	
1. G7440A	CN13201093	
2. G4513A	CN13360196	
3. G4614A	CN1330031	
4.		
5.		
6.		
7.		
8.		
9.		
10.		

Preparation

- ☒ Discuss any specific issues with the customer before starting.
- ☒ Review the instrument logbook for recorded problems and comments.
- ☒ Save instrument control settings before starting the procedure.
- ☒ Perform a general inspection of the system for cleanliness.
- ☒ Check for proper installation of parts, assemblies, sensors etc.
- ☒ Check system for required installation of components, settings as defined by current Service Notes.
- ☒ Check for required firmware updates and verify with customers if they would like them installed.
- ☒ Before starting the following procedures, record the Detector Signal Output(s) in the results table. If the GC is turned OFF or in a service mode, comparing the detector outputs before and after the service is not possible.

Revision: 2.01, Issued: September 15, 2021
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DE number: 44166.759722222
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Preventive Maintenance Procedure

Clean and inspect GC

- ☒ Unplug power cord from the power source.
- ☒ Open GC covers and vacuum/remove any dust/debris. Pay particular attention to cooling fans.
- ☒ Inspect internal connectors for proper contact and placement.
- ☒ Reconnect Power to the GC. Power the GC on and verify the power on self-test passed.
- ☒ Verify oven motor spins freely and turns on with the oven door closed; off when the door is opened.
- ☒ Verify operation of all other fans - the inlet and EPC cooling fans.
- ☒ Verify oven intake/outlet flap assembly is operating smoothly while heating and cooling the oven.

Inlet and detector consumable replacement

- ☒ For the inlets installed, perform inlet maintenance as defined in the 7890 manual - "Maintaining Your GC" - for the inlet(s) installed.
- ☒ Replace the split vent trap cartridge filter on units with these inlets: Split/Spitless Capillary (SSL), Multi-Mode Inlet (MMI), Programmed Temperature Vaporizer (PTV), Volatiles Interface (VI).
- ☒ If the inlet system is used in Split Mode with viscous samples, inspect and clean the split vent tube on the inlet and flush or replace the tubing between the inlet and the split vent trap.
- ☒ If the GC includes a Flame Ionization Detector (FID), replace the jet. If the ignitor shows any buildup of sample or corrosion, replace the ignitor. Examine the FID collector and castle assemblies for contamination - clean as necessary.

Zero Sensors and Leak test

- ☒ Zero all pressure sensors per the procedure in the 7890 "Advanced User Guide".
- ☒ Perform inlet pressure decay test(s) as defined in the 7890 "Troubleshooting Manual".
- ☒ If the PM is done in preparation for an Operational Qualification, then the pressure decay test defined within that protocol can be used for the PM.
- ☒ Record if test passed or failed in the results table.

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ALS Maintenance

- ☒ Section NOT applicable
- ☒ Check all cabling and configuration settings between GC, tray, and injectors.
- ☒ Vacuum or remove any dust, especially around fans.
- ☒ Check operation of all fans.
- ☒ Check syringes for smooth plunger operation.
- ☒ Check for smooth operation of the needle support - clean if necessary

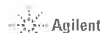
Restore Instrument

- ☒ Restore the normal operating conditions or customer method using the Data System.
- ☒ Purge the system with carrier flow for 15 minutes
- ☒ Bake out the system, then restore the normal operating conditions
- ☒ After equilibration, check and record the post PM detector signal output values.
- ☒ Results should be similar or lower than the detector outputs recorded prior to PM.
- ☒ Perform a chemical checkout. If this is a routine PM, inject the customer's sample using the ALS if applicable. This will act as a final checkout of both the ALS and the GC.

Note: If the PM Service is performed prior to a qualification service, then use the qualification procedure as a guide for final instrument set up and checkout.

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Signature Page

Service Review

- ☒ Attach available reports/printouts of all tests to this documentation.
- ☒ Record the Preventive Maintenance service activity in the customer's records/logbook.
- ☒ Update/reset instrument maintenance counters as appropriate.
- ☒ Affix the PM sticker to the system or instrument logbook based on the customer's request.
- ☒ Complete the Service Engineer Comments section if there are additional comments.
- ☒ Review with the customer this service, parts replaced, and test results obtained.
- ☒ If the instrument firmware was updated, record the details of the change in the Service Engineer's Comments box or if necessary, in the customer's IQ records.
- ☐ Supply the customer with a copy of the Smart Alerts flyer.
- ☐ Describe Smart Alerts to the customer.
- ☐ Install Smart Alerts if requested.

7890 GC Test Results Table

Detector Signal Outputs	Before PM Service	After PM Service
Front detector output	N/A	N/A
Back detector output		
AUX detector output		
Pressure decay test	Expected test result	Actual test result
Front inlet pressure decay test	Pass	Pass
Back inlet pressure decay test	Pass	N/A

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7890 Parts List Table

The following kits are recommended for capillary and purged packed inlets. If this is a general PM and the customer has a preferred set of consumables, you may use the customer's consumables.

Part description	Part number	Product or model# where used	Quantity consumed
SSL Capillary Inlet PM kit, Splitless	5188-6497	7890A/B	1
SSL Capillary Inlet PM kit, split	5188-6496	7890A/B	1
SSL Capillary Ultra Inert Inlet Gold Seal with Washer	5190-6144	7890A/B	N/A
SSL Capillary Ultra Inert Inlet Splitless Liner - Single taper with Glass Wool	5190-2293	7890A/B	
SSL Capillary Ultra Inert Inlet Low Pressure Drop Split Liner - with Glass Wool	5190-2295	7890A/B	
PP Inlet PM kit	5188-6498	7890A/B	
Split vent trap PM kit, single cartridge (for MMI, PTV & VI)	5188-6495	7890A/B	
MMI Cleaning Kit	63510-60820	7890A/B	
PTV Septumless Head Rebuild Kit	5182-9747	7890A/B	
PTV Septumless Head Teflon Guide	5182-9748	7890A/B	
Ignitor (glow plug) assembly with O-ring	19231-60680	7890A/B	
FID Collector Rebuild/Cleaning Kit	G1531-67000	7890A/B	
Standard .011-inch FID Jet for capillary FID base	G1531-80560	7890A/B	
High Temperature .018-inch FID Jet for capillary FID base	G1531-80620	7890A/B	
Standard .018-inch FID Jet for packed column with packed FID base	18710-20119	7890A/B	
Standard .011-inch FID Jet for capillary column with packed/adaptable FID base	19244-80560	7890A/B	
High Temperature .018-inch FID Jet for capillary column with packed/adaptable FID base	19244-80620	7890A/B	
NPD Jet, universal fit, .011-inch ID	G1534-80580	7890A/B	
NPD Jet, universal fit, .011-inch ID Extended lip	G1534-80590	7890A/B	
SSL Capillary Ultra Inert Inlet Gold Seal with Washer	5190-6144	7890A/B	
SSL Capillary Ultra Inert Inlet Splitless Liner - Single taper with Glass Wool	5190-2293	7890A/B	
**FID Collector Replacement Kit, if needed	G1531-67001	7890A/B	

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Service Engineer Comments

If there are any specific points you wish to note as part of performing the service or other items of interest for the customer, please write include them in this box.

Service Completion

Service request number 6005224259 Date service completed 11 Mar 2021
 Agilent signature [Signature] Customer signature Nahini L.
 Total number of pages in this document 8

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Agilent CrossLab Start Up Services

Agilent GCMS

Preventive Maintenance Checklist

Agilent Preventive Maintenance provides factory recommended service for your analytical instruments to assure reliable operation and the accuracy of your results.

Delivered by highly trained and certified service engineers using genuine Agilent parts and supplies, Agilent Preventive Maintenance provides everything you need to reduce unplanned downtime and keep your systems operating at their peak. This checklist will be completed at the end of the service and provided to you as a record of the preventive maintenance activities.

Introduction

Select the appropriate PM to be done and then perform the checklist under that section

- ☐ Interim Preventive Maintenance 6 months
☒ Major Preventive Maintenance Yearly

This checklist covers the following model(s):

Type	Model
SQ	5973 Series MSD
SQ	5975 Series MSD
SQ	5977 Series MSD
TQ	7000 Series MS/MS
TQ	7010 Series MS/MS
QTOF	7200 Series QTOF
QTOF	7250 Series QTOF

Customer Information

- Customers should provide all necessary operating supplies upon request of the engineer.
- A customer representative should be available to the engineer while performing the preventive maintenance procedures. Customers are responsible for regular maintenance and are encouraged to observe the service representative.
- Any parts not included in the Parts Lists section of this document are not part of the recommended Preventive Maintenance service nor are they included in the price of this service.
- If a system requires the use of extra or special procedures and/or parts for the maintenance service, then these must be ordered separately and charged as a repair, which may incur additional costs.



Important Customer Web Links

- For more information about Agilent Technologies services, please visit our website using the following URL: <http://www.agilent.com/instruments/crosslab-instrument-services-service-portal>
- To access Agilent University, visit <http://www.agilent.com/crosslab/university/> to learn about training options, which include online, classroom and onsite delivery. A training specialist can work directly with you to help determine your best options.
- A useful Agilent Resource Center web page is available, which includes short videos on maintenance, quick lists of consumables for new instruments, and other valuable information. Check out the Resource Page here: <http://www.agilent.com/chem/agilentresources>
- Need technical support, FAQs, supplies? – visit our Support Home page at <http://www.agilent.com/support/home>
- Get answers. Share insights. Build connections: Join the Agilent Community at <https://community.agilent.com/webcym>

Service Engineer's Responsibilities

- Contact the customer and ensure that all necessary supplies are available before the preventive maintenance visit.
- Complete empty fields with the relevant information.
- Complete the relevant checkboxes in the checklist using either a "X" or tick mark "✓".
- Check "Section not applicable" check boxes to indicate services/tasks not delivered, as appropriate.
- Complete the Preventive Maintenance services in the most logical order relevant to the individual system service in the order of the tasks listed.
- Complete the Service Review section together with the customer.
- Ask the customer to sign the Service Completion section including the customer's and your signature.

Additional Instruction Notes

- Preventive maintenance is a factory recommended procedure designed to reduce the likelihood of electronic/mechanical failures. Failure to perform preventive maintenance may reduce the long-term reliability of certain instruments and systems. Two preventative maintenances (PMs) per year are recommended, the Major PM Service will be performed annually with an Interim PM performed 6 months after the Major PM.



Agilent Consumed Parts List Table

☐ Section not applicable

Part Description	Part Number	Product or Model# where used	Quantity consumed

Signature Page

Service Engineer Comments (optional)

Service Completion

Service request number 609 522 7249 Date service completed 11 Mar 2023

Agilent signature [Signature] Customer signature [Signature]

Total number of pages in this document _____

Parts – As needed as part of the PM

Common MS Filters and Seals – 5973/5975/5977/7000/7010/7200/7250 Series

Yes/No	Interim/Major/As needed	Description	Part number
<input type="checkbox"/>	<input type="checkbox"/>	Helium gas filter – if required	RMSH42
<input type="checkbox"/>	<input type="checkbox"/>	Nitrogen gas filter – if required	RMSH42
<input type="checkbox"/>	<input type="checkbox"/>	Big Universal Trap, 1/8" fittings, Hydrogen, if required	RMSH42
<input type="checkbox"/>	<input type="checkbox"/>	Gas Clean Carrier Gas Kit for 7890 for Nitrogen or Helium, Bracket, Mount and Filter – if required	CP17968
<input type="checkbox"/>	<input type="checkbox"/>	Gas Clean Filter Kit GC/MS 1/8 in (complete replacement kit) – if required	CP17974
<input type="checkbox"/>	<input type="checkbox"/>	Gas Clean G3/MS Filter – if required	CP17973
<input type="checkbox"/>	<input type="checkbox"/>	Chemical Ionization Gas Purifier (CI systems) – if required	5190-0071
<input type="checkbox"/>	<input type="checkbox"/>	Agilent AVF Platinum, 1 quart	5191-5851

Gas filters need to be changed only if required

MS Maintenance Supplies for 5973/5975/5977 Series

Yes/No	Interim/Major/As needed	Description	Part number
<input type="checkbox"/>	<input type="checkbox"/>	Diffusion pump fluid (Diffusion Pump Models)	4040-0509 Qty 2
<input type="checkbox"/>	<input type="checkbox"/>	IDP-3 Tip Seal Replacement Kit (IDP-3 Dry Pump Models)	07077-67016
<input type="checkbox"/>	<input type="checkbox"/>	IDP-3 Tip Seal Replacement Kit (no tools – CSD P/N)	5190-9561
<input type="checkbox"/>	<input type="checkbox"/>	IDP-3 Tip Seal Replacement Kit (no tools – VPD P/N)	IDP3TS
<input type="checkbox"/>	<input type="checkbox"/>	Filter element for IDP-3	REPLSLRFLTR2
<input type="checkbox"/>	<input type="checkbox"/>	0542 Oil Mist Eliminator 3/4G & 3/8	SR03706556
<input type="checkbox"/>	<input type="checkbox"/>	Exhaust oil mist trap (thread) Edwards/ Pfeiffer	G1099-80039

MS Maintenance Supplies for 7000/7010 Series

Yes/No	Interim/Major/As needed	Description	Part number
<input type="checkbox"/>	<input type="checkbox"/>	Nitrogen gas filter	RMSH42
<input type="checkbox"/>	<input type="checkbox"/>	IDP-10 Tip Seal Replacement Kit (IDP-10 Dry Scroll Pump Models)	G7004-67023
<input type="checkbox"/>	<input type="checkbox"/>	IDP-10 Tip Seal Replacement Kit (no tools – VPD P/N)	X3807-67000
<input type="checkbox"/>	<input type="checkbox"/>	Oil Mist Filter RV5	G4500-80043
<input type="checkbox"/>	<input type="checkbox"/>	Filter element for the IDP-10	REPLSLRFLTR1

MS Maintenance Supplies for 7200/7250 Series

Yes/No	Interim/Major/As needed	Description	Part number
<input type="checkbox"/>	<input type="checkbox"/>	Nitrogen gas filter – if required	RMSH42
<input type="checkbox"/>	<input type="checkbox"/>	IRS Probe Maintenance Kit (7200 Series only)	G7005-60170
<input type="checkbox"/>	<input type="checkbox"/>	05502 Oil Mist Eliminator	SR03706500
<input type="checkbox"/>	<input type="checkbox"/>	IDP-15 Tip Seal Replacement Kit (IDP-15 Dry Pump Models)	5190-9513
<input type="checkbox"/>	<input type="checkbox"/>	IDP-15 Tip Seal Replacement Kit (no tools – VPD P/N)	X5815-67000
<input type="checkbox"/>	<input type="checkbox"/>	Filter element, for SH-110/SH-112/IDP-15 exhaust silencer	REPLSLRFLTR
<input type="checkbox"/>	<input type="checkbox"/>	DS 3/8 MAG. PLUG AND GASKET	SR03701824

MS Maintenance Supplies for JetClean

Yes/No	Interim/Major/As needed	Description	Part number
<input type="checkbox"/>	<input type="checkbox"/>		

Consumable Parts Reference – Purchasable by customer, not included as part of PM

Common MSD Maintenance Supplies 5973/5975/5977/7000/7010/7200/7250 Series

Yes/No	Interim/Major/As needed	Description	Part number
<input type="checkbox"/>	<input type="checkbox"/>	CI High Temperature Filaments	G7005-60061 Qty 2
<input type="checkbox"/>	<input type="checkbox"/>	HE-El Filaments	G7002-60001
<input type="checkbox"/>	<input type="checkbox"/>	LE-El Filaments	G3850-60001
<input type="checkbox"/>	<input type="checkbox"/>	CI High Temperature Filament – all MSDs	G7005-60072
<input type="checkbox"/>	<input type="checkbox"/>	PFTFA GC/MS Tuning Standard calibrant	05971-60571
<input type="checkbox"/>	<input type="checkbox"/>	PFTD calibrant, 1 mL	0500-8510
<input type="checkbox"/>	<input type="checkbox"/>	PFET, IRM calibrant for GC QTOF 0.5 mL	5190-0551

MSD Maintenance Supplies 5973/5975/5977 Series

Yes/No	Interim/Major/As needed	Description	Part number
<input type="checkbox"/>	<input type="checkbox"/>	CI interface tip seal (tip and spring combo)	G1999-60412
<input type="checkbox"/>	<input type="checkbox"/>	CI interface tip seal (tip only)	G3870-20542
<input type="checkbox"/>	<input type="checkbox"/>	CI interface tip seal spring (spring only)	G1999-20023
<input type="checkbox"/>	<input type="checkbox"/>	Recoiler insulator	G1099-20133 Qty 2
<input type="checkbox"/>	<input type="checkbox"/>	Lens insulator/holder (HES)	G7002-20074
<input type="checkbox"/>	<input type="checkbox"/>	Ring heater/sensor assembly (HES)	G7002-60064
<input type="checkbox"/>	<input type="checkbox"/>	Ceramic insulator for Extractor (HES)	G7002-20064
<input type="checkbox"/>	<input type="checkbox"/>	Transfer-Line Tip Cap, Threaded	G3870-20547
<input type="checkbox"/>	<input type="checkbox"/>	Transfer-Line Tip Base, Threaded	G3870-20548

MS Maintenance Supplies for 7000/7010 Series

Yes/No	Interim/Major/As needed	Description	Part number
<input type="checkbox"/>	<input type="checkbox"/>	CI interface tip seal – 7000	G1999-60412
<input type="checkbox"/>	<input type="checkbox"/>	CI interface tip seal – 7010	G7002-60412
<input type="checkbox"/>	<input type="checkbox"/>	CI interface tip seal (tip only)	G3870-20542
<input type="checkbox"/>	<input type="checkbox"/>	CI interface tip seal spring (spring only)	G1999-20023
<input type="checkbox"/>	<input type="checkbox"/>	Recoiler insulator – 7000	G1099-20133 Qty 2
<input type="checkbox"/>	<input type="checkbox"/>	Lens insulator/holder (HES)	G7002-20074
<input type="checkbox"/>	<input type="checkbox"/>	Ring heater/sensor assembly (HES)	G7002-60064
<input type="checkbox"/>	<input type="checkbox"/>	Ceramic insulator for Extractor (HES)	G7002-20064
<input type="checkbox"/>	<input type="checkbox"/>	Transfer-Line Tip Cap, Threaded	G3870-20547
<input type="checkbox"/>	<input type="checkbox"/>	Transfer-Line Tip Base, Threaded	G3870-20548

MS Maintenance Supplies for 7200 Series

Yes/No	Interim/Major/As needed	Description	Part number
<input type="checkbox"/>	<input type="checkbox"/>	Extractor Lens Insulator	G7005-20133
<input type="checkbox"/>	<input type="checkbox"/>	Ion Focus Insulator	G7005-20442
<input type="checkbox"/>	<input type="checkbox"/>	Ring Heater/Sensor Assembly	G7005-60118
<input type="checkbox"/>	<input type="checkbox"/>	IRS Xfer Tip	G7005-20542
<input type="checkbox"/>	<input type="checkbox"/>	IRS Xfer Tip Spring	G7005-20024

MS Maintenance Supplies for 7250 Series

Yes/No	Interim/Major/As needed	Supplies	Description	Part number
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Leak detector/holder (HES)	07002-20074
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Ring heater/sensor assembly (HES)	07003-60015
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Ceramic insulator for Extractor (HES)	07003-20044
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Transfer-Line Tip Cap, Threaded	03870-20547
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Transfer-Line Tip Base, Threaded	03870-20543
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	EI Extractor Transfer Tip	03870-20542
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	EI Tip Compression Spring	01995-20023

MS Maintenance Supplies for Intuvo 9000 MS Systems

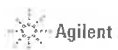
Yes/No	Interim/Major/As needed	Supplies	Description	Part number
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Synched MS Tail - Packaged	64500-60009
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Synched MS Tail (HES) - Micropipet	64500-60109

Common MS Maintenance Supplies

Yes/No	Interim/Major/As needed	Parts required	Description	Part number
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Abusive paper, 50 um	5061-5656
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Alumina powder	232000201
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Cloth, clean (pkg of 15)	05992-60051
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Cloth, cleaning (pkg of 500)	9310-4818
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Cotton swabs (pkg of 100)	3080-5400
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Gloves, clean, large	8550-00030
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Gloves, clean, small	8550-00025

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Teledyne Tekmar ATOMX Purge and Trap Preventive Maintenance Checklist - Standard

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Agilent Preventive Maintenance provides factory recommended service for your analytical systems to assure reliable operation and the accuracy of your results. Delivered by highly-trained and certified service engineers using genuine Agilent parts and supplies, Agilent Preventive Maintenance provides everything you need to reduce unplanned downtime and keep your systems operating at their peak. For more information about Agilent Technologies services please visit our web site using the following URL: <http://www.chem.agilent.com/en-us/products/services/pages/default.aspx>

Customer Information

- Customers should provide all necessary operating supplies upon request of the engineer.
- A customer representative should be available to the engineer while performing the preventive maintenance procedures.
- Any parts, not included in the Parts Lists section of this document, are not part of the recommended Preventive Maintenance service, nor are they included in the price of this service.
- If a system requires the use of additional or special procedures and/or parts for the instrument service, then these must be ordered separately and charged as a repair, which may incur additional costs.

Service Engineer's Responsibilities

- Only complete/printout pages that relate to the system or module being serviced.
- Complete empty fields with the relevant information.
- Complete the relevant checkboxes in the checklist using a "X" or tick mark "✓" in the checkbox.
- Complete Not Applicable check boxes to indicate services not delivered, as needed.
- Complete the PM service in the order of the tasks listed.
- Complete the Service Review section together with the customer.

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Select pages for required products or Page 1 of 5

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Teledyne Tekmar ATOMX Purge and Trap Preventive Maintenance Checklist - Standard

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System Information

Guidance

- ☐ Check this box if an instrument configuration report is attached instead of completing the table.

Instrument system name and ID	US13246002
Instrument system site and location	SECOT, Bangkok
List system component product numbers	List the serial numbers of each component
1. TMR-ATOMX	1. US13246002
2.	2.
3.	3.
4.	4.
5.	5.
6.	6.
7.	7.
8.	8.
9.	9.
10.	10.

Preparation

- Discuss any specific issues with the customer prior to starting.
- Review the instrument logbook.
- Save instrument control settings before starting the procedure.
- Perform general inspection of system for cleanliness.
- Check for proper installation of safety-related parts, assemblies, sensors etc.
- Check for required firmware updates and verify with customers if they would like it installed.

Teledyne Tekmar ATOMX Purge and Trap Preventive Maintenance Checklist - Standard

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Check External Supplies

- ☒ Section NOT Applicable
- ☒ Verify the gas source is supplying an input pressure of 50 - 100 psi to the ATOMX. If the customer is using a gas cylinder, verify the cylinder is at 500+ psi.
- ☒ Verify that the waste container has sufficient volume to contain the waste generated. Empty if necessary.
- ☒ Replace the DI water supply with fresh DI water.
 - Make sure the DI water supply is sufficient for sample analysis (1 Liter minimum)
- ☐ Make sure the methanol supply is sufficient for sample analysis.

Atomx Leak and Pressure Check

- ☐ Section NOT Applicable
- ☒ Scan through the sample log to verify that the purge pressures are staying consistent throughout the daily runs.
- ☒ Use the Teklink software to check the standard pressure.
- ☒ Run a leak check to ensure that the unit is leak tight.

Inspect ATOMX Hardware

- ☒ Section NOT Applicable
- ☒ Check the tray vial holes for foreign particles. Clean if necessary.
- ☒ Inspect the needle for particles or sample build up. Clean if necessary.
- ☒ Inspect the sparger glassware for damage and/or discoloration that could restrict flow or cause contamination. Replace if necessary.
- ☒ Inspect the drain tubing for clogging. Replace the drain line if necessary.
- ☒ Lubricate the ATOMX Carousel Drive. Refer to the diagram on page 6-25 of the ATOMX User Manual for lubrication points. Teledyne Tekmar recommends using DuPont Krytox lubrication.
- ☒ Lubricate the ATOMX Elevator. Refer to the diagram on page 6-32 of the ATOMX User Manual for lubrication points. Teledyne Tekmar recommends using DuPont Krytox lubrication.

Restore Instrument

Guidance

If the PM service is performed prior to a qualification service, then use the qualification procedure as a guide for final instrument set up and checkout.

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Teledyne Tekmar ATOMX Purge and Trap
Preventive Maintenance Checklist - Standard

Service Review

- ☒ Attach available reports/printouts of all tests to this documentation.
- ☒ Record the PM service activity in the customer's instrument records/logbook
- ☒ Update/reset instrument maintenance counters as appropriate
- ☒ Affix the PM sticker to the system or instrument logbook based on the customer's request.
- ☒ Complete the Service Engineer Comments section below if there are additional comments
- ☒ Review the service and any test results with the customer.
- ☒ If the instrument firmware was updated, record the details of the change in the Service Engineer's Comments box below or if necessary, in the customer's IQ records.

Product or Product Type Test Results Table

Test Description	Expected Test Result	Actual Test Result
Leak Test	Pass	Pass

Product or Product Type Parts List Table

Part Description	Part Number	Product or Model# where used	Quantity Consumed
Sparger Glassware	Ask the customer what size sparger glassware they are using; refer to the ATOMX parts list for part numbers.	TMR-ATOMX	1
Lubricant, Dupont Krytox	15-0283-000	TMR-ATOMX	1
Tubing, Drain, Self Retracting	15-0087-002	TMR-ATOMX	1

Teledyne Tekmar ATOMX Purge and Trap
Preventive Maintenance Checklist - Standard

Service Engineer Comments (optional)

If there are any specific points you wish to note as part of performing the service or other items of interest for the customer, please write in this box.

Other Important Customer Web Links

- ☐ How to get information on your product: Literature Library - <http://www.agilent.com/chem/library>
- ☐ Need to know more? - www.agilent.com/chem/education
- ☐ Need technical support, FAQs? - www.agilent.com/chem/techsupport
- ☐ Need supplies? - www.agilent.com/chem/supplies

Service Completion

Service request number 6004827231 Date service completed 11 Mar 2020

Agilent signature Sp N. Customer signature Nalini L.

Number of pages in this document _____