ภาคผนวกที่ 4

เอกสารสอบเทียบเครื่องมือ

เอกสารแนบ 4-1 เอกสารสอบเทียบเครื่องมือตรวจวัดคุณภาพอากาศ

เอกสารแนบ 4-2 เอกสารสอบเทียบเครื่องมือตรวจวัดเสียง

เอกสารแนบ 4-3 เอกสารสอบเทียบเครื่องมือตรวจวิเคราะห์คุณภาพน้ำผิวดิน

เอกสารแนบ 4-4 เอกสารสอบเทียบเครื่องมือตรวจวิเคราะห์คุณภาพน้ำใต้ดิน

เอกสารแนบ 4-1

เอกสารสอบเทียบเครื่องมือตรวจวัดคุณภาพอากาศ

บริษัท เอส.พี.เอส. คอนซัลติ้ง เซอร์วิส จำกัด
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High Volume Air Sampler Calibration Report

Calibration Method : Multipoint Orifice Flow Transfer Standard	Model : TE 5025A	S/N : 3611

Calibration Data				
High Volume Air Sampler Data		Calibration Data		
Recorder No.	Blower No.	Date	Actual Flowrate (ft^3/min)	R^2
B01	B01	02/02/2026	y = 1.147x-3.983	0.998
B02	B02	02/02/2026	y = 1.158x-3.531	0.997
B03	B03	02/02/2026	y = 1.109x-2.595	0.999
B04	B04	02/02/2026	y = 1.123x-1.928	0.998
B05	B05	02/02/2026	y = 1.145x-3.659	0.999
B06	B06	02/02/2026	y = 1.100x-2.379	0.999
B07	B07	02/02/2026	y = 1.122x-2.377	0.999
B08	B08	02/02/2026	y = 1.102x-2.500	0.998
B09	B09	02/02/2026	y = 1.121x-3.479	0.999
B10	B10	02/02/2026	y = 1.143x-3.199	0.996
B11	B11	03/02/2026	y = 1.105x-1.251	0.999
B12	B12	03/02/2026	y = 1.136x-3.106	0.996
B13	B13	03/02/2026	y = 1.142x-2.536	0.998
B14	B14	03/02/2026	y = 1.135x-3.133	0.998
B15	B15	03/02/2026	y = 1.111x-2.932	0.998
B16	B16	04/02/2026	y = 1.104x-3.794	0.998
B17	B17	04/02/2026	y = 1.151x-2.773	0.998
B18	B18	04/02/2026	y = 1.140x-2.730	0.998
B19	B19	04/02/2026	y = 1.137x-2.624	0.998
B20	B20	04/02/2026	y = 1.139x-1.402	0.998
B21	B21	04/02/2026	y = 1.131x-1.657	0.999
B22	B22	04/02/2026	y = 1.166x-3.887	0.997
B23	B23	04/02/2026	y = 1.162x-4.278	0.998
B24	B24	04/02/2026	y = 1.128x-2.436	0.998
B25	B25	04/02/2026	Y = 1.159x-4.833	0.998
B26	B26	03/02/2026	y = 1.103x-1.969	0.997
B27	B27	04/02/2026	y = 1.149x-3.761	0.997
B28	B28	04/02/2026	y = 1.134x-3.377	0.999
B29	B29	04/02/2026	y = 1.118x-2.903	0.997
B30	B30	04/02/2026	y = 1.157x-2.504	0.999
B31	B31	04/02/2026	y = 1.165x-3.108	0.999
B32	B32	04/02/2026	y = 1.113x-2.480	0.999
B33	B33	04/02/2026	y = 1.155x-2.774	0.997
B34	B34	04/02/2026	y = 1.125x-1.905	0.997

Calibrated by : Adul Dangklom (Mr.Adul Dangklom)

Approved by : (Mr. Peera Detudom)

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High Volume Air Sampler Calibration Report

Calibration Method : Multipoint Orifice Flow Transfer Standard	Model : TE 5025A	S/N : 3611

Calibration Data				
High Volume Air Sampler Data		Calibration Data		
Recorder No.	Blower No.	Date	Actual Flowrate (ft^3/min)	R^2
B35	B35	04/02/2026	y = 1.154x-3.696	0.996
B36	B36	04/02/2026	y = 1.119x-2.463	0.997
B37	B37	04/02/2026	y = 1.129x-3.721	0.998
B38	B38	02/02/2026	y = 1.182x-2.931	0.997
B39	B39	02/02/2026	y = 1.062x-1.512	0.999
B40	B40	02/02/2026	y = 1.163x-3.556	0.997
B41	B41	02/02/2026	y = 1.116x-1.975	0.996
B42	B42	02/02/2026	y = 1.152x-4.140	0.997
B43	B43	02/02/2026	y = 1.167x-3.646	0.996
B44	B44	02/02/2026	y = 1.178x-4.362	0.999
R01	R01	02/02/2026	y = 1.097x-2.630	0.997
R02	R02	02/02/2026	y = 1.138x-3.218	0.996
R03	R03	02/02/2026	y = 1.133x-3.084	0.998
R04	R04	02/02/2026	y = 1.121x-2.102	0.998
R05	R05	02/02/2026	y = 1.041x+0.894	0.997
R06	R06	02/02/2026	y = 1.075x+0.254	0.997
R07	R07	03/02/2026	y = 1.126x-2.841	0.996
R08	R08	03/02/2026	y = 1.091x-2.104	0.996
R09	R09	03/02/2026	y = 1.065x+0.557	0.996
R10	R10	03/02/2026	y = 1.093x-1.217	0.999
R11	R11	03/02/2026	y = 1.130x-3.938	0.999
R12	R12	05/02/2026	y = 1.164x-2.698	0.997
R13	R13	05/02/2026	y = 1.120x-3.336	0.998
R14	R14	05/02/2026	y = 1.034x+0.445	0.997
R15	R15	05/02/2026	y = 1.076x+0.429	0.998
R16	R16	05/02/2026	y = 1.107x-1.468	0.996
R17	R17	05/02/2026	y = 1.078x-1.668	0.998
R18	R18	05/02/2026	y = 1.160x-5.001	0.997
R19	R19	05/02/2026	y = 1.077x-2.680	0.997
R20	R20	05/02/2026	y = 1.185x-4.839	0.998

Calibrated by : Adul Dangklom (Mr.Adul Dangklom)

Approved by : (Mr. Peera Detudom)

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High Volume Air Sampler Calibration Report

Calibration Method : Multipoint Orifice Flow Transfer Standard	Model : TE 5025A	S/N : 3611

Calibration Data				
High Volume Air Sampler Data		Calibration Data		
Recorder No.	Blower No.	Date	Actual Flowrate (ft^3/min)	R^2
B01	B01	05/02/2025	y = 1.190x-4.759	0.999
B02	B02	05/02/2025	y = 1.167x-1.802	0.999
B03	B03	03/02/2025	y = 1.142x-3.352	0.997
B04	B04	06/02/2025	y = 1.160x-3.139	0.998
B05	B05	06/02/2025	y = 1.155x-5.601	0.996
B06	B06	06/02/2025	y = 1.150x-1.476	0.999
B07	B07	03/02/2025	y = 1.143x-3.035	0.998
B08	B08	03/02/2025	y = 1.161x-4.459	0.999
B09	B09	05/02/2025	y = 1.177x-3.970	0.996
B10	B10	03/02/2025	y = 1.144x-2.471	0.998
B11	B11	03/02/2025	y = 1.195x-5.384	0.996
B12	B12	04/02/2025	y = 1.168x-4.228	0.998
B13	B13	04/02/2025	y = 1.165x-3.801	0.999
B14	B14	04/02/2025	y = 1.148x-3.248	0.996
B15	B15	04/02/2025	y = 1.173x-4.773	0.997
B16	B16	04/02/2025	y = 1.156x-4.042	0.998
B17	B17	06/02/2025	y = 1.140x-2.730	0.999
B18	B18	06/02/2025	y = 1.171x-4.178	0.999
B19	B19	06/02/2025	y = 1.151x-3.979	0.999
B20	B20	04/02/2025	y = 1.129x-1.255	0.999
B21	B21	04/02/2025	y = 1.132x-3.156	0.999
B22	B22	04/02/2025	y = 1.147x-2.649	0.997
B23	B23	03/02/2025	y = 1.158x-3.223	0.999
B24	B24	05/02/2025	y = 1.144x-3.476	0.997
B25	B25	03/02/2025	Y = 1.071x-1.478	0.997
B26	B26	04/02/2025	y = 1.142x-4.263	0.999
B27	B27	04/02/2025	y = 1.175x-5.192	0.996
B28	B28	04/02/2025	y = 1.173x-5.127	0.999
B29	B29	04/02/2025	y = 1.145x-1.952	0.996
B30	B30	06/02/2025	y = 1.162x-3.062	0.999
B31	B31	03/02/2025	y = 1.182x-5.652	0.998
B32	B32	03/02/2025	y = 1.167x-3.993	0.999
B33	B33	05/02/2025	y = 1.168x-4.451	0.998
B34	B34	05/02/2025	y = 1.127x-3.203	0.999

Calibrated by : Adul Dangklom (Mr.Adul Dangklom)

Approved by : (Mr. Peera Detudom)

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High Volume Air Sampler Calibration Report

Calibration Method : Multipoint Orifice Flow Transfer Standard	Model : TE 5025A	S/N : 3611

Calibration Data				
High Volume Air Sampler Data		Calibration Data		
Recorder No.	Blower No.	Date	Actual Flowrate (ft^3/min)	R^2
B35	B35	05/02/2025	y = 1.163x-3.579	0.997
B36	B36	05/02/2025	y = 1.130x-2.116	0.999
B37	B37	04/02/2025	y = 1.146x-2.265	0.996
B38	B38	04/02/2025	y = 1.156x-6.034	0.998
B39	B39	03/02/2025	y = 1.151x-3.366	0.998
B40	B40	03/02/2025	y = 1.174x-4.582	0.999
B41	B41	06/02/2025	y = 1.123x-1.633	0.997
B42	B42	03/02/2025	y = 1.149x-3.382	0.997
B43	B43	03/02/2025	y = 1.137x-2.074	0.997
B44	B44	03/02/2025	y = 1.155x-1.460	0.999
R01	R01	04/02/2025	y = 1.121x-3.007	0.999
R02	R02	03/02/2025	y = 1.159x-5.099	0.999
R03	R03	05/02/2025	y = 1.138x-2.774	0.998
R04	R04	05/02/2025	y = 1.118x-2.575	0.999
R05	R05	03/02/2025	y = 1.136x-1.720	0.998
R06	R06	05/02/2025	y = 1.154x-2.706	0.997
R07	R07	03/02/2025	y = 1.037x+1.361	0.999
R08	R08	03/02/2025	y = 1.146x-3.762	0.996
R09	R09	05/02/2025	y = 1.121x-2.360	0.997
R10	R10	05/02/2025	y = 1.180x-4.626	0.999
R11	R11	05/02/2025	y = 1.147x-3.861	0.996
R12	R12	03/02/2025	y = 1.128x-4.676	0.998
R13	R13	04/02/2025	y = 1.135x-4.055	0.999
R14	R14	04/02/2025	y = 1.153x-3.122	0.997
R15	R15	03/02/2025	y = 1.161x-5.223	0.998
R16	R16	03/02/2025	y = 1.187x-6.674	0.999
R17	R17	03/02/2025	y = 1.120x-1.730	0.999
R18	R18	03/02/2025	y = 1.146x-2.347	0.998
R19	R19	06/02/2025	y = 1.161x-5.195	0.999
R20	R20	06/02/2025	y = 1.134x-3.449	0.998

Calibrated by : Adul Dangklom (Mr.Adul Dangklom)

Approved by : (Mr. Peera Detudom)

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High Volume PM-10 Air Sampler Calibration Report

Calibration Method : Multipoint Orifice Flow Transfer Standard	Model : TE 5025A	S/N : 3611

Calibration Data

High Volume PM-10 Data		Calibration Data		
Recorder No.	Blower No.	Date	Actual Flowrate (ft^3/min)	R^2
B01	B01	04/02/2025	y = 1.135x-1.122	0.996
B02	B02	04/02/2025	y = 1.140x-0.728	0.999
B03	B03	04/02/2025	y = 1.160x-3.702	0.998
B04	B04	05/02/2025	y = 1.154x-4.671	0.999
B05	B05	06/02/2025	y = 1.151x-2.705	0.998
B06	B06	03/02/2025	y = 1.114x-1.672	0.997
B07	B07	03/02/2025	y = 1.085x+0.543	0.996
B08	B08	04/02/2025	y = 1.149x-2.014	0.998
B09	B09	03/02/2025	y = 1.081x+0.344	0.997
B10	B10	03/02/2025	y = 1.094x-1.679	0.997
B11	B11	05/02/2025	y = 1.137x-0.690	0.997
B12	B12	03/02/2025	y = 1.094x-1.679	0.997
B13	B13	03/02/2025	y = 1.172x-3.186	0.998
B14	B14	05/02/2025	y = 1.160x-5.111	0.998
B15	B15	03/02/2025	y = 1.141x-2.637	0.998
B16	B16	04/02/2025	y = 1.106x+1.699	0.998
B17	B17	04/02/2025	y = 1.105x+1.676	0.998
B18	B18	04/02/2025	y = 1.176x-3.948	0.997
B19	B19	04/02/2025	y = 1.065x+0.997	0.998
B20	B20	04/02/2025	y = 1.163x-5.103	0.997
B21	B21	05/02/2025	y = 1.120x+0.250	0.999
B22	B22	06/02/2025	y = 1.152x-3.458	0.998
B23	B23	06/02/2025	y = 1.149x-3.696	0.999
B24	B24	03/02/2025	y = 1.109x-1.930	0.999
B25	B25	03/02/2025	y = 1.156x-4.876	0.998
B26	B26	05/02/2025	y = 1.118x-2.223	0.997
B27	B27	03/02/2025	y = 1.127x-3.668	0.999
B28	B28	04/02/2025	y = 1.112x-2.294	0.999
B29	B29	04/02/2025	y = 1.155x-4.309	0.997
B30	B30	04/02/2025	y = 1.116x-2.651	0.998
B31	B31	03/02/2025	y = 1.086x+2.828	0.999
B32	B32	04/02/2025	y = 1.099x-0.279	0.998
B33	B33	04/02/2025	y = 1.152x-4.474	0.997
B34	B34	04/02/2025	y = 1.149x-0.892	0.997

Calibrated by : Adul Dangklom (Mr.Adul Dangklom)

Approved by : (Mr. Peera Detudom)

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Personal Pump Calibration Report

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

Environmental Conditions
Temperature : 25 ± 3 °c
Pressure : 1010 ± 15 mmbar

Personal Pump Data				Calibration Data								
					Flow Rate (ml/min)						Value From Calibration Curve	
					Setting			Actual (Q std.)				
No.	Brand	Model	Serial No.	Date	1	2	3	1	2	3	y	R^2
B01	SKC	224-PCXR4	262101	05/01/2026	1,000	1,500	2,000	1,004	1,501	2,003	1.010x - 18.941	0.999
B02	SKC	224-PCXR4	626166	05/01/2026	1,000	1,500	2,000	1,000	1,500	2,002	1.012x - 23.452	0.999
B03	SKC	224-PCXR4	612968	05/01/2026	1,000	1,500	2,000	993	1,503	2,001	1.008x - 15.587	1.000
B04	SKC	224-PCXR4	602804	06/01/2026	1,000	1,500	2,000	1,001	1,498	1,996	0.997x + 2.672	1.000
B05	SKC	224-PCXR4	612693	07/01/2026	1,000	1,500	2,000	999	1,494	1,993	0.995x + 1.555	1.000
B06	SKC	224-PCXR4	262188	06/01/2026	1,000	1,500	2,000	1,002	1,501	2,004	1.007x - 12.528	1.000
B07	SKC	224-PCXR4	626262	06/01/2026	1,000	1,500	2,000	1,003	1,501	2,002	1.010x - 19.021	0.999
B08	SKC	224-PCXR4	626100	06/01/2026	1,000	1,500	2,000	1,005	1,500	2,006	1.006x - 8.619	1.000
B09	SKC	224-PCXR4	626479	05/01/2026	1,000	1,500	2,000	1,001	1,500	2,000	1.007x - 14.458	1.000
B10	SKC	224-PCXR4	091950	05/01/2026	1,000	1,500	2,000	998	1,503	2,000	1.001x - 5.985	1.000
B11	SKC	224-PCXR8	564315	05/01/2026	1,000	1,500	2,000	993	1,494	1,993	1.010x - 25.765	0.999
B12	SKC	224-PCXR4	034656	05/01/2026	1,000	1,500	2,000	995	1,497	1,998	0.996x - 4.796	0.999
B13	SKC	224-PCXR4	602073	05/01/2026	1,000	1,500	2,000	994	1,499	1,975	0.990x + 6.525	0.999
B14	SKC	224-PCXR4	626313	05/01/2026	1,000	1,500	2,000	993	1,499	1,994	1.001x - 7.791	1.000
B15	SKC	224-PCXR4	626474	05/01/2026	1,000	1,500	2,000	992	1,505	2,002	1.012x - 23.464	1.000
B16	SKC	224-PCXR4	626477	06/01/2026	1,000	1,500	2,000	993	1,496	1,991	0.996x + 0.945	1.000
B17	SKC	224-PCXR4	626860	06/01/2026	1,000	1,500	2,000	1,000	1,500	2,001	1.007x - 14.414	1.000
B18	SKC	224-PCXR4	691484	05/01/2026	1,000	1,500	2,000	994	1,502	2,002	1.015x - 30.763	0.999
B19	SKC	224-PCXR4	691599	05/01/2026	1,000	1,500	2,000	993	1,490	1,999	1.006x - 14.713	1.000
B20	SKC	224-PCXR4	691587	05/01/2026	1,000	1,500	2,000	991	1,500	1,997	1.005x - 13.565	1.000
B21	SKC	224-PCXR4	691531	05/01/2026	1,000	1,500	2,000	1,002	1,500	2,000	1.002x - 6.050	1.000
B22	SKC	224-PCXR4	691654	05/01/2026	1,000	1,500	2,000	1,008	1,498	1,995	1.000x - 6.158	0.999
B23	SKC	224-PCXR4	798393	06/01/2026	1,000	1,500	2,000	992	1,498	1,972	0.990x + 3.813	0.999
B24	SKC	224-PCXR4	626363	06/01/2026	1,000	1,500	2,000	1,003	1,493	2,002	1.001x - 5.201	1.000
B25	SKC	224-PCXR4	798489	06/01/2026	1,000	1,500	2,000	993	1,496	1,995	1.003x - 10.857	1.000
B26	SKC	224-PCXR4	798479	06/01/2026	1,000	1,500	2,000	994	1,505	2,002	1.012x - 23.253	1.000
B27	SKC	224-PCXR4	691673	06/01/2026	1,000	1,500	2,000	996	1,506	1,989	0.994x + 5.799	1.000
B28	SKC	224-PCXR4	691570	06/01/2026	1,000	1,500	2,000	995	1,502	1,998	0.999x - 5.193	1.000
B29	SKC	224-PCXR4	626472	05/01/2026	1,000	1,500	2,000	995	1,491	1,993	0.999x - 4.662	1.000
B30	SKC	224-PCXR4	691489	05/01/2026	1,000	1,500	2,000	1,003	1,500	1,998	1.002x - 6.804	1.000
B31	SKC	224-PCXR4	691509	05/01/2026	1,000	1,500	2,000	993	1,500	1,997	0.992x + 4.256	1.000
B32	SKC	224-PCXR4	091567	05/01/2026	1,000	1,500	2,000	994	1,487	1,972	0.990x - 2.389	0.999
B33	SKC	224-PCXR4	091756	05/01/2026	1,000	1,500	2,000	993	1,496	1,998	1.013x - 28.816	0.999
B34	SKC	224-PCXR4	612962	05/01/2026	1,000	1,500	2,000	996	1,502	2,003	1.011x - 21.717	1.000
B35	SKC	224-PCXR4	602682	06/01/2026	1,000	1,500	2,000	998	1,493	2,000	1.001x - 2.561	1.000
B36	SKC	224-PCXR4	626166	06/01/2026	1,000	1,500	2,000	993	1,497	1,994	1.003x - 8.755	1.000
B37	SKC	224-PCXR4	626256	06/01/2026	1,000	1,500	2,000	993	1,508	2,007	1.009x - 10.996	1.000
B38	SKC	224-PCXR4	626167	06/01/2026	1,000	1,500	2,000	993	1,502	2,000	1.013x - 28.162	0.999
B39	SKC	224-PCXR4	034637	06/01/2026	1,000	1,500	2,000	1,000	1,497	1,993	0.991x + 9.544	1.000
B40	SKC	224-PCXR4	798349	06/01/2026	1,000	1,500	2,000	1,000	1,499	1,994	0.998x - 0.160	1.000

Calibrated by : Adul Dangklom (Mr. Adul Dangklom)

Approved by : (Mr. Peera Detudom)

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Rotameter Calibration Report (For Personal Pump Low Flow Adjust)

Calibration Method : Dry Cal Primary Flowmeter	Model : Defender 510-H	S/N : 136833

Calibration Data

Rotameter Data			Calibration Data							
				Flow Rate (ml/min)						Value From Calibration Curve	
				Flow Rate (Reading)			Actual (Q std.)				
No.	Brand	Model	Date	1	2	3	1	2	3	y	R^2
L-R01	Dwyer	VFA-21	05/01/2026	50	100	200	50.2	102.0	203.9	0.991x + 2.329	1.000
L-R02	Dwyer	VFA-21	05/01/2026	50	100	200	50.4	101.3	200.5	1.006x - 0.627	0.999
L-R03	Dwyer	VFA-21	06/01/2026	50	100	200	50.1	99.4	202.7	1.017x - 1.146	1.000
L-R04	Dwyer	VFA-21	06/01/2026	50	100	200	49.8	100.5	201.0	1.010x - 1.541	0.999
L-R05	Dwyer	VFA-21	05/01/2026	50	100	200	50.2	101.4	203.8	0.990x + 2.384	1.000
L-R06	Dwyer	VFA-21	06/01/2026	50	100	200	50.4	99.1	201.5	1.003x - 0.197	1.000

Calibrated by : Adul Dangklom (Mr.Adul Dangklom)

Approved by : (Mr. Peera Detudom)

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Calibration Report

Non-Dispersive Infrared CO Analyzer

Date : 10 March 2026	Brand : API	Model : 300E
No. : CO-B01		Serial No. : 782

Calibrator (Dilution System)

Brand : API		Model : 700
Last Cal. Date : 01 September 2025		Serial No. : 911

Reference Standard Gas

Standard Gas : Carbon Monoxide (CO)		Cylinder No. : D711839
Certified Date : 14 March 2024	Expired Date : 14 March 2032	Cylinder Conc. : 4,580 ppm

Calibrating Condition

Pressure : 1011 mmba Temp : 24.6 °C % RH : 50

Calibration Setting

Span	Initial Reading (Before Adj.), PPM		-	Final Reading (After Adj.), PPM
Set Point	Expected Concentration	Analyzer Response	%Dif	Analyzer Response
Zero	0	-0.10	-	0
CO Span	40.00	39.97	-0.075	40.00

API Model 300E CO Analyzer Check List

Parameter	Observed Value	Units	Nominal Range
Range	50	PPM	0-1000 ppm
Stability	0.10	PPM	< 1 ppm With Zero Air
CO Measure	4014.3	mV	2500-4800 mV
CO Reference	3948.4	mV	2500-4800 mV
Measure/Reference Ratio	1.180	-	1.1-1.3 W/Zero Air
Sample Pressure	28.6	In-Hg-A	~2"< Ambient Absolute Pressure
Sample Flow	805	CC/Min	800 ± 10%
Sample Temperature	48.3	°C	48 ± 4
Bench Temperature	48.1	°C	48 ± 2
Wheel Temperature	68.5	°C	68 ± 2
Box Temperature	30.7	°C	Ambient Temp + 7 ± 10
Photo-Drive	3037.2	mV	250 mV to 4750 mV
Slope	1.017	-	1.0 ± 0.3
Offset	0.2	-	0 ± 0.3

Calibrated by : Adul Dangklom (Mr.Adul Dangklom)

Approved by : (Mr. Peera Detudom)

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Calibration Report
Non-Dispersive Infrared CO Analyzer

Date :	16 March 2026	Brand :	Thermo	Model :	48C
No.	CO-B08			Serial No.	0508011067

Calibrator (Dilution System)

Brand	: API	Model	: 700
Last Cal. Date	: 01 September 2025	Serial No.	: 911

Reference Standard Gas

Standard Gas	: Carbon Monoxide (CO)			Cylinder No.	: D711839
Certified Date	: 14 March 2024	Expired Date	: 14 March 2032	Cylinder Conc.	: 4,580 ppm

Calibrating Condition

Pressure	1011	mmbar	Temp. 24.6 °C	% RH	50

Calibration Setting

Span / Set Point	Initial Reading (Before Adj.),PPM: Expected Concentration	Analyzer Response	%Dif	Final Reading (After Adj.),PPM: Analyzer Response
Zero	0	0.10	-	0
CO Span	40.00	39.98	-0.050	40.00

Instrument Status

Chamber Temp	47.3 °C	Flow	1.5 LPM
Pressure	730.8 mm Hg	Motor Speed	100.00%

Calibrated by : Adul Dangklom (Mr.Adul Dangklom)

Approved by : (Mr. Peera Detudom)

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Calibration Report
Non-Dispersive Infrared CO Analyzer

Date :	16 March 2026	Brand :	Thermo	Model :	48C
No.	CO-B11			Serial No.	401304262

Calibrator (Dilution System)

Brand	: API	Model	: 700
Last Cal. Date	: 01 September 2025	Serial No.	: 911

Reference Standard Gas

Standard Gas	: Carbon Monoxide (CO)			Cylinder No.	: D711839
Certified Date	: 14 March 2024	Expired Date	: 14 March 2032	Cylinder Conc.	: 4,580 ppm

Calibrating Condition

Pressure	1011	mmbar	Temp. 24.6 °C	% RH	50

Calibration Setting

Span / Set Point	Initial Reading (Before Adj.),PPM: Expected Concentration	Analyzer Response	%Dif	Final Reading (After Adj.),PPM: Analyzer Response
Zero	0	0.11	-	0
CO Span	40.00	40.04	0.100	40.00

Instrument Status

Chamber Temp	47.4 °C	Flow	1.5 LPM
Pressure	730.7 mm Hg	Motor Speed	100.00%

Calibrated by : Adul Dangklom (Mr.Adul Dangklom)

Approved by : (Mr. Peera Detudom)

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Calibration Report
Non-Dispersive Infrared CO Analyzer

Date :	10 March 2026	Brand :	API	Model :	300E
No.	CO-B15			Serial No.	226

Calibrator (Dilution System)

Brand	: API	Model	: 700
Last Cal. Date	: 01 September 2025	Serial No.	: 911

Reference Standard Gas

Standard Gas	: Carbon Monoxide (CO)			Cylinder No.	: D711839
Certified Date	: 14 March 2024	Expired Date	: 14 March 2032	Cylinder Conc.	: 4,580 ppm

Calibrating Condition

Pressure	1011	mmbar	Temp. 24.6 °C	% RH	50

Calibration Setting

Span / Set Point	Initial Reading (Before Adj.), PPM: Expected Concentration	Analyzer Response	%Dif	Final Reading (After Adj.), PPM: Analyzer Response
Zero	0	0.10	-	0
CO Span	40.00	39.95	-0.125	40.00

API Model 300E CO Analyzer Check List

Parameter	Observed Value	Units	Nominal Range
Range	50	PPM	0-1000 ppm
Stability	0.10	PPM	< 1 ppm With Zero Air
CO Measure	4014.9	mV	2500-4800 mV
CO Reference	3947.6	mV	2500-4800 mV
Measure/Reference Ratio	1.180	-	1.1-1.3 W/Zero Air
Sample Pressure	28.5	In-Hg-A	~2"< Ambient Absolute Pressure
Sample Flow	811	CC/Min	800 ± 10%
Sample Temperature	48.4	°C	48 ± 4
Bench Temperature	48.2	°C	48 ± 2
Wheel Temperature	68.3	°C	68 ± 2
Box Temperature	30.6	°C	Ambient Temp + 7 ± 10
Photo-Drive	3044.1	mV	250 mV to 4750 mV
Slope	1.017	-	1.0 ± 0.3
Offset	0.2	-	0 ± 0.3

Calibrated by : Adul Dangklom (Mr.Adul Dangklom)

Approved by : (Mr. Peera Detudom)

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CALIBRATION REPORT
CHEMILUMINESCENT NO / NO_2 / NO_x ANALYZER

DATE :	16 March 2026	BRAND :	API	MODEL :	200A
NO.	NOX-B12			SERIAL NO.	2675

Calibrator (Dilution System)

Brand	: API	Model	: 700
Last Cal. Date	: 01 Septemmber 2025	Serial No.	: 911

Reference Standard Gas

Standard Gas	: Nitric Oxide (NO)			Cylinder No.	: A006745V
Certified Date	: 12 March 2025	Expired Date	: 12 March 2028	Cylinder Conc.	: 48.7 ppm

CALIBRATING CONDITION

Pressure	1011	mmbar	Temp. 24.6 °C	% RH	50

CALIBRATION SETTING

Span / Set Point	Initial Reading (Before Adj.),PPB: Expected Concentration	Analyzer Response	%Dif	Final Reading (After Adj.),PPB: Analyzer Response	Slope
Zero	0	0.10	-	0	-
NO Span	400	400.1	0.025	400.0	1.009
NO_x Span	400	400.2	0.050	400.0	1.012

API Model 200A NO_x Analyzer Check List

Test Values	Observed Value	Units	Nominal Range
RANGE	500	PPB	500 standard
STABILITY (Zero Gas)	0.1	PPB	< 2 with zero air
SAMPLE FLOW	509	cc/min	500 ± 50
OZONE FLOW	79	cc/min	80 ± 15
PMT	103.1	mV	-20 - 150
AZERO	93.7	mV	-20 - 150
HVPS	672	V	420 - 900 constant
RCELL TEMP	50.1	°C	50 ± 1
BOX TEMP	29.4	°C	8 - 48
PMT TEMP	7.2	°C	7 ± 2
MOLY TEMP	315.2	°C	315 ± 5
RCELL PRESS	8.5	IN-Hg-A	2 - 10 constant
SAMPLE PRESS	28.7	IN-Hg-A	25 - 30 constant
NO Span Conc	400	PPB	20 - 20,000
NO_x Span Conc	400	PPB	20 - 20,000
NO Slope	1.009	-	1.0 ± 0.3
NO_x Slope	1.012	-	1.0 ± 0.3
NO Offset	1.6	mV	-20 to +150
NO_x Offset	1.0	mV	-20 to 150
Stability at Zero	0.1	PPB	< 0.2
Stability at Span	0.2	PPB	< 2 ppb @ 400 ppb span gas

Calibrated by : Adul Dangklom (Mr.Adul Dangklom)

Approved by : (Mr.Peera Detudom)

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CALIBRATION REPORT

CHEMILUMINESCENT NO / NO_2 / NO_x ANALYZER

DATE : 10 March 2026 BRAND : API MODEL : 200A

NO. NOX-B15 SERIAL NO. 213

Calibrator (Dilution System)

Brand	: API	Model	: 700
Last Cal. Date	: 01 September 2025	Serial No.	: 911

Reference Standard Gas

Standard Gas	: Nitric Oxide (NO)			Cylinder No.	: A006745V
Certified Date	: 12 March 2025	Expired Date	: 12 March 2028	Cylinder Conc.	: 48.7 ppm

CALIBRATING CONDITION

Pressure 1011 mmbar Temp. 24.6 °C % RH 50

CALIBRATION SETTING

Span / Set Point	Initial Reading (Before Adj.),PPB			Final Reading (After Adj.),PPB	
	Expected Concentration	Analyzer Response	%Dif	Analyzer Response	Slope
Zero	0	0.10	-	0	-
NO Span	400	400.1	0.025	400.0	1.010
NO_x Span	400	400.2	0.050	400.0	1.013

API Model 200A NO_x Analyzer Check List

Test Values	Observed Value	Units	Nominal Range
RANGE	500	PPB	500 standard
STABILITY (Zero Gas)	0.1	PPB	< 2 with zero air
SAMPLE FLOW	506	cc/min	500 ± 50
OZONE FLOW	78	cc/min	80 ± 15
PMT	103.2	mV	-20 - 150
AZERO	93.9	mV	-20 - 150
HVPS	671	V	420 - 900 constant
RCELL TEMP	50.4	°C	50 ± 1
BOX TEMP	29.1	°C	8 - 48
PMT TEMP	7.3	°C	7 ± 2
MOLY TEMP	314.9	°C	315 ± 5
RCELL PRESS	8.5	IN-Hg-A	2 - 10 constant
SAMPLE PRESS	28.7	IN-Hg-A	25 - 30 constant
NO Span Conc	400	PPB	20 - 20,000
NO_x Span Conc	400	PPB	20 - 20,000
NO Slope	1.010	-	1.0 ± 0.3
NO_x Slope	1.013	-	1.0 ± 0.3
NO Offset	1.5	mV	-20 to +150
NO_x Offset	0.9	mV	-20 to 150
Stability at Zero	0.1	PPB	< 0.2
Stability at Span	0.2	PPB	< 2 ppb @ 400 ppb span gas

Calibrated by : Adul Dangklom (Mr.Adul Dangklom)

Approved by : (Mr.Peera Detudom)

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CALIBRATION REPORT

CHEMILUMINESCENT NO / NO_2 / NO_x ANALYZER

DATE : 16 March 2026 BRAND : API MODEL : 200A

NO. NOX-B15 SERIAL NO. 213

Calibrator (Dilution System)

Brand	: API	Model	: 700
Last Cal. Date	: 01 September 2025	Serial No.	: 911

Reference Standard Gas

Standard Gas	: Nitric Oxide (NO)			Cylinder No.	: A006745V
Certified Date	: 12 March 2025	Expired Date	: 12 March 2028	Cylinder Conc.	: 48.7 ppm

CALIBRATING CONDITION

Pressure 1011 mmbar Temp. 24.6 °C % RH 50

CALIBRATION SETTING

Span / Set Point	Initial Reading (Before Adj.),PPB			Final Reading (After Adj.),PPB	
	Expected Concentration	Analyzer Response	%Dif	Analyzer Response	Slope
Zero	0	-0.10	-	0	-
NO Span	400	399.6	-0.100	400.0	1.006
NO_x Span	400	399.9	-0.025	400.0	1.009

API Model 200A NO_x Analyzer Check List

Test Values	Observed Value	Units	Nominal Range
RANGE	500	PPB	500 standard
STABILITY (Zero Gas)	0.1	PPB	< 2 with zero air
SAMPLE FLOW	505	cc/min	500 ± 50
OZONE FLOW	78	cc/min	80 ± 15
PMT	103.4	mV	-20 - 150
AZERO	94.2	mV	-20 - 150
HVPS	671	V	420 - 900 constant
RCELL TEMP	50.3	°C	50 ± 1
BOX TEMP	29.2	°C	8 - 48
PMT TEMP	7.4	°C	7 ± 2
MOLY TEMP	315.3	°C	315 ± 5
RCELL PRESS	8.2	IN-Hg-A	2 - 10 constant
SAMPLE PRESS	28.5	IN-Hg-A	25 - 30 constant
NO Span Conc	400	PPB	20 - 20,000
NO_x Span Conc	400	PPB	20 - 20,000
NO Slope	1.006	-	1.0 ± 0.3
NO_x Slope	1.009	-	1.0 ± 0.3
NO Offset	1.2	mV	-20 to +150
NO_x Offset	0.8	mV	-20 to 150
Stability at Zero	0.1	PPB	< 0.2
Stability at Span	0.2	PPB	< 2 ppb @ 400 ppb span gas

Calibrated by : Adul Dangklom (Mr.Adul Dangklom)

Approved by : (Mr.Peera Detudom)

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CALIBRATION REPORT

CHEMILUMINESCENT NO / NO_2 / NO_x ANALYZER

DATE : 10 March 2026 BRAND : API MODEL : 200A

NO. NOX-B17 SERIAL NO. 1977

Calibrator (Dilution System)

Brand	: API	Model	: 700
Last Cal. Date	: 01 September 2025	Serial No.	: 911

Reference Standard Gas

Standard Gas	: Nitric Oxide (NO)			Cylinder No.	: A006745V
Certified Date	: 12 March 2025	Expired Date	: 12 March 2028	Cylinder Conc.	: 48.7 ppm

CALIBRATING CONDITION

Pressure 1011 mmbar Temp. 24.6 °C % RH 50

CALIBRATION SETTING

Span / Set Point	Initial Reading (Before Adj.),PPB			Final Reading (After Adj.),PPB	
	Expected Concentration	Analyzer Response	%Dif	Analyzer Response	Slope
Zero	0	-0.10	-	0	-
NO Span	400	399.7	-0.075	400.0	1.007
NO_x Span	400	399.9	-0.025	400.0	1.010

API Model 200A NO_x Analyzer Check List

Test Values	Observed Value	Units	Nominal Range
RANGE	500	PPB	500 standard
STABILITY (Zero Gas)	0.1	PPB	< 2 with zero air
SAMPLE FLOW	508	cc/min	500 ± 50
OZONE FLOW	78	cc/min	80 ± 15
PMT	103.1	mV	-20 - 150
AZERO	93.8	mV	-20 - 150
HVPS	672	V	420 - 900 constant
RCELL TEMP	50.1	°C	50 ± 1
BOX TEMP	29.3	°C	8 - 48
PMT TEMP	7.2	°C	7 ± 2
MOLY TEMP	315.3	°C	315 ± 5
RCELL PRESS	8.4	IN-Hg-A	2 - 10 constant
SAMPLE PRESS	28.6	IN-Hg-A	25 - 30 constant
NO Span Conc	400	PPB	20 - 20,000
NO_x Span Conc	400	PPB	20 - 20,000
NO Slope	1.007	-	1.0 ± 0.3
NO_x Slope	1.010	-	1.0 ± 0.3
NO Offset	1.1	mV	-20 to +150
NO_x Offset	0.7	mV	-20 to 150
Stability at Zero	0.1	PPB	< 0.2
Stability at Span	0.2	PPB	< 2 ppb @ 400 ppb span gas

Calibrated by : Adul Dangklom (Mr.Adul Dangklom)

Approved by : (Mr.Peera Detudom)

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

ilac-MRA NRC-TSU-TS1/2025 CALIBRATION 0049

CERTIFICATE No : 26M2266 PAGE : 1 OF 2
REFERENCE No : 80204-1

Certificate of Calibration

EQUIPMENT	:	DIGITAL BALANCE
MANUFACTURER	:	METTLER TOLEDO
MODEL	:	XS105DU
SERIAL No	:	1126422905
ID No	:	BA 05/50
CONDITION AS RECEIVED	:	USED ITEM
SUBMITTED BY	:	S.P.S. CONSULTING SERVICE CO., LTD. 7 SOI PHAHOLYOTHIN 24, PHAHOLYOTHIN RD., JOMPOL, CHATUCHAK, BANGKOK 10900
CALIBRATED BY	:	SUCHAT S.
CALIBRATION DATE	:	05-Mar-26
APPROVED BY	:	PONGSAK J.
ISSUED DATE	:	06-Mar-26
RECEIVED DATE	:	05-Mar-26

Certificate

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

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

CERTIFICATE No : 26M2266

Calibration Report

EQUIPMENT	:	DIGITAL BALANCE	**MODEL**	:	XS105DU
MANUFACTURER	:	METTLER TOLEDO	**S/N**	:	1126422905
ID No	:	BA 05/50	**RECEIVED DATE**	:	05-Mar-26
AIR PRESSURE	:	1004mbar ± 1mbar	**CALIBRATION DATE**	:	05-Mar-26
AMBIENT TEMPERATURE	:	25° C ± 1° C	**RELATIVE HUMIDITY**	:	50 %RH ± 10 % RH

CONDITION OF THIS RESULTS OF CALIBRATION

1. THIS INSTRUMENT WAS CALIBRATED BY ACCORDING TO UKAS LAB 14 EDITION 6:2019 BY USING KNOWN WEIGHT STANDARD WEIGHT. THE BALANCE WAS NOT ADJUSTED BEFORE CALIBRATION. THE BALANCE HAS NO ZERO TRACKING FUNCTION. REPEATABILITY WAS MEASURED BY USING 10 REPEATED MEASUREMENTS. LINEARITY WAS MEASURED COVERING 10 POINTS, EVENLY SPREAD OVER THE RANGE. THE INSTRUMENT WAS SET ZERO BEFORE PERFORMING THE LINEARLITY TEST. OFF-CENTER LOADING WAS MEASURED BY USING STANDARD WEIGHTS PLACED ON THE PAN AND MOVED TO VARIOUS POSITIONS ON THE PAN.
2. REFERENCE STANDARD INSTRUMENTS :-

INSTRUMENT	MODEL	SERIAL No	CERTIFICATE No	DUE DATE
1) STANDARD WEIGHT SET	E2	QK-I-151	C02259116	28-Jan-27
2) STANDARD WEIGHT	E2	15843	C02259117	29-Jan-27

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

RESULT OF CALIBRATION :- WITHOUT ADJUSTMENT

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

NOMINAL VALUE (g)	BALANCE READING (g)	CORRECTION (g)	UNCERTAINTY (± g)
0.00	0.00000	0.00000	0.000065
0.02	0.02000	0.00000	0.000065
0.10	0.10000	0.00000	0.000066
0.20	0.20000	0.00000	0.000066
0.50	0.50001	-0.00001	0.000065
1.00	1.00001	-0.00001	0.000066
2.00	2.00000	0.00000	0.000067
5.00	5.00001	-0.00001	0.000068
10.00	10.00004	-0.00004	0.000070
20.00	20.00006	-0.00006	0.000078
50.00	50.0000	0.0000	0.00012
100.00	100.0002	-0.0002	0.00019
120.00	120.0002	-0.0002	0.00022

5. OFF CENTER LOADING ERROR



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

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

END OF CALIBRATION REPORT

F-G010 REV 03

บริษัท เอส.พี.เอส. คอนซัลติ้ง เซอร์วิส จำกัด
S.P.S. CONSULTING SERVICE CO., LTD.
7 ซอยพหลโยธิน 24 ถนนพหลโยธิน แขวงจอมพล เขตจตุจักร กรุงเทพฯ 10900
7 Soi Phaholyothin 24, Phaholyothin Rd., Jompol, Chatuchak, Bangkok 10900
Tel : (662) 939-0370-72, Fax : (662) 513-4221, E-mail : sale@spscon.com , www.spscon.com

Calibration Report
Total Hydrocarbon Analyzer

Date : 02 March 2026 Brand : HORIBA Model : APHA-360CE
No. B01 Serial No. 421195400I

Calibrator (Dilution System)

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

Reference Standard Gas

Standard Gas	: Methane (CH_4)	Cylincer No.	: D612165
Certified Date	: 25 February 2023	Expired Date : 25 February 2031	Cylinder Conc. : 453 ppm

Calibratng Condition

Pressure 1011 mmbar Temp. 24.6 °C % RH 50
Start Time : 1:00 PM

Pre-Calibration Checks

Change Particulate Filter Yes Station Temp : 25.0 °C
Leak Test Yes

Calibration Setting

Span Set Point	Initial Reading (Befored Adj)		Final Reading (After Adj)
	Expected Concentration (PPM)	Analyzer Response (PPM)	Analyzer Response (PPM)
Zero	0	0.10	0
Span	10	10.05	10

Calibration Setting (Final)

Span Instrument Gain: 0.995 Finish Time: 2:00 PM

APHA-360 Total Hydrocarbon Analyzer

Test Values	Observed Value	Units	Nominal Range
Signal (CH_4)	911.9	mV	800-1,350
Signal (THC)	916.7	mV	800-1,350
Detector	78.1	kPa	((Pressure Air/1013)x100)-20 ± 4 kPa
Purifier	19.2	kPa	8 - 25
NIR	258.9	°C	260 ± 10
Bypath	0.9	L / min	0.9 ± 0.3
Over Flow	0.8	L / Min	0.8

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

United Analyst and Engineering Consultant Co., Ltd.
3 Soi Udomsuk 41, Sukhumvit Road, Bangchak, Phrakhanong, Bangkok 10260
Tel.0 2763 2828 Fax 0 2763 2800 www.uaeconsultant.com E-mail: uae@uaeconsultant.com
NSC-TISI-TIS 17025 TESTING 0207

ใบรายงานผลการวิเคราะห์

ชื่อโครงการ	: การติดตามตรวจสอบผลกระทบสิ่งแวดล้อม และการตรวจสอบการปฏิบัติตามมาตรการป้องกันและแก้ไขผลกระทบสิ่งแวดล้อม โครงการก่อสร้างรถไฟความเร็วสูง ระยะที่ 1 สายกรุงเทพฯ-นครราชสีมา สัญญาที่ 3-4 ช่วงลำตะคลอง-สีคิ้ว และช่วงกุดจิก-โคกกรวด
ชื่อลูกค้า	: บริษัท อิตาเลียนไทย ดีเวล็อปเมนต์ จำกัด (มหาชน)
ที่อยู่	: 2034/132-16, อาคารอิตัลไทยทาวเวอร์ ถนนเพชรบุรีตัดใหม่ แขวงบางกะปิ เขตห้วยขวาง กรุงเทพมหานคร 10310
ข้อมูลผู้ติดต่อ	: โทรศัพท์ : 08 8627 1864 อีเมล : environmentpublicrelations@gmail.com
สถานที่ชักตัวอย่าง	: โรงพยาบาลส่งเสริมสุขภาพตำบลคลองไผ่ ตำบลคลองไผ่ อำเภอสีคิ้ว จังหวัดนครราชสีมา
ชนิดตัวอย่าง	: อากาศในบรรยากาศโดยทั่วไป
วันที่ชักตัวอย่าง	: *, **, ***, ****, *****
เวลาที่ชักตัวอย่าง	: *, **, ***, ****, *****
ผู้ชักตัวอย่าง	: นายศิรพัชร จงพลุงเกียรติ
ผู้วิเคราะห์	: นางสาวเจตจริบทร์ ทำสะอาด
วันที่รับตัวอย่าง	: 10 เมษายน 2569
วันที่วิเคราะห์	: 10-20 เมษายน 2569
วันที่ออกรายงานผล	: 21 เมษายน 2569
เลขที่ใบรายงานผล	: 2026-U031277
เลขที่งาน	: 2025-000443
หมายเลขปฏิบัติการ	: T26AH969-0001 - T26AH969-0005

ดัชนี	หน่วย	วิธีการวิเคราะห์	ผลการวิเคราะห์ โรงพยาบาลส่งเสริมสุขภาพตำบลคลองไผ่ ตำบลคลองไผ่ อำเภอสีคิ้ว จังหวัดนครราชสีมา				
			* T26AH969-0001	** T26AH969-0002	*** T26AH969-0003	**** T26AH969-0004	***** T26AH969-0005
ฝุ่นละอองรวม (TSP)#	ไมโครกรัมต่อลูกบาศก์เมตร	US EPA, CODE OF FEDERAL REGULATIONS, 40 CFR CHAPTER I-PART 50 APPENDIX B, REFERENCE METHOD FOR THE DETERMINATION OF SUSPENDED PARTICULATE MATTER IN THE ATMOSPHERE (HIGH-VOLUME METHOD) REVISED AS OF JULY 1, 2021	69.0	75.3	73.7	69.4	72.8
ฝุ่นละอองขนาดไม่เกิน 10 ไมครอน (PM10)#	ไมโครกรัมต่อลูกบาศก์เมตร	US EPA, CODE OF FEDERAL REGULATIONS, 40 CFR CHAPTER I-PART 50 APPENDIX J, REFERENCE METHOD FOR THE DETERMINATION OF PARTICULATE MATTER AS PM10 IN THE ATMOSPHERE (HIGH-VOLUME METHOD) REVISED AS OF JULY 1, 2021	32.6	39.2	37.7	34.9	34.0
สภาพตัวอย่าง			สมบูรณ์	สมบูรณ์	สมบูรณ์	สมบูรณ์	สมบูรณ์

: อยู่ในขอบข่ายที่ได้รับการรับรอง ISO/IEC 17025 จากหน่วยรับรองระดับประเทศ สำนักงานมาตรฐานผลิตภัณฑ์อุตสาหกรรม

หมายเหตุ
TSP, PM10 : คำนวณเทียบสภาวะมาตรฐานที่อุณหภูมิ 25 องศาเซลเซียส และความดัน 1 บรรยากาศ
* : ชักตัวอย่างเมื่อเวลา 09:00 น. วันที่ 5 เมษายน 2569 ถึงเวลา 09:00 น. วันที่ 6 เมษายน 2559
** : ชักตัวอย่างเมื่อเวลา 09:00 น. วันที่ 6 เมษายน 2569 ถึงเวลา 09:00 น. วันที่ 7 เมษายน 2559
*** : ชักตัวอย่างเมื่อเวลา 09:00 น. วันที่ 7 เมษายน 2569 ถึงเวลา 09:00 น. วันที่ 8 เมษายน 2559
**** : ชักตัวอย่างเมื่อเวลา 09:00 น. วันที่ 8 เมษายน 2569 ถึงเวลา 09:00 น. วันที่ 9 เมษายน 2559
***** : ชักตัวอย่างเมื่อเวลา 09:00 น. วันที่ 9 เมษายน 2569 ถึงเวลา 09:00 น. วันที่ 10 เมษายน 2569

(นางสาวบุษกร เลิศภาณุมาศ)
ผู้ควบคุมห้องปฏิบัติการ

ISO 9001 Quality Management Systems CERTIFIED ISO 14001 Environmental Management CERTIFIED ISO 45001 Occupational Health and Safety Management CERTIFIED
• ห้ามคัดถ่ายใบรายงานผลการวิเคราะห์นี้แต่เพียงบางส่วน โดยไม่ได้รับอนุญาตจากห้องปฏิบัติการเป็นลายลักษณ์อักษร
• ใบรายงานผลนี้รับรองผลเฉพาะกับตัวอย่างที่นำมาทดสอบเท่านั้น

- End of Analysis Report -

United Analyst and Engineering Consultant Co., Ltd.
3 Soi Udomsuk 41, Sukhumvit Road, Bangchak, Phrakhanong, Bangkok 10260
Tel.0 2763 2828 Fax 0 2763 2800 www.uaeconsultant.com E-mail: uae@uaeconsultant.com
NSC-TISI-TIS 17025 TESTING 0207

ใบรายงานผลการวิเคราะห์

ชื่อโครงการ	: การติดตามตรวจสอบผลกระทบสิ่งแวดล้อม และการตรวจสอบการปฏิบัติตามมาตรการป้องกันและแก้ไขผลกระทบสิ่งแวดล้อม โครงการก่อสร้างรถไฟความเร็วสูง ระยะที่ 1 สายกรุงเทพฯ-นครราชสีมา สัญญาที่ 3-4 ช่วงลำตะคลอง-สีคิ้ว และช่วงกุดจิก-โคกกรวด
ชื่อลูกค้า	: บริษัท อิตาเลียนไทย ดีเวล็อปเมนต์ จำกัด (มหาชน)
ที่อยู่	: 2034/132-161 อาคารอิตัลไทยทาวเวอร์ ถนนเพชรบุรีตัดใหม่ แขวงบางกะปิ เขตห้วยขวาง กรุงเทพมหานคร 10310
ข้อมูลผู้ติดต่อ	: โทรศัพท์ : 08 8627 1864 อีเมล : environmentpublicrelations@gmail.com
สถานที่ชักตัวอย่าง	: โรงพยาบาลส่งเสริมสุขภาพตำบลโคกกรวด ตำบลโคกกรวด อำเภอเมืองนครราชสีมา จังหวัดนครราชสีมา
ชนิดตัวอย่าง	: อากาศในบรรยากาศโดยทั่วไป
วันที่ชักตัวอย่าง	: *, **, ***, ****, *****
เวลาที่ชักตัวอย่าง	: *, **, ***, ****, *****
ผู้ชักตัวอย่าง	: นายศิรพัชร จงพลุงเกียรติ
ผู้วิเคราะห์	: นางสาวเจตจริบทร์ ทำสะอาด
วันที่รับตัวอย่าง	: 10 เมษายน 2569
วันที่วิเคราะห์	: 10-20 เมษายน 2569
วันที่ออกรายงานผล	: 21 เมษายน 2569
เลขที่ใบรายงานผล	: 2026-U031281
เลขที่งาน	: 2025-000443
หมายเลขปฏิบัติการ	: T26AH969-0006 - T26AH969-0010

ดัชนี	หน่วย	วิธีการวิเคราะห์	ผลการวิเคราะห์ โรงพยาบาลส่งเสริมสุขภาพตำบลโคกกรวด ตำบลโคกกรวด อำเภอเมืองนครราชสีมา จังหวัดนครราชสีมา				
			* T26AH969-0006	** T26AH969-0007	*** T26AH969-0008	**** T26AH969-0009	***** T26AH969-0010
ฝุ่นละอองรวม (TSP)#	ไมโครกรัมต่อลูกบาศก์เมตร	US EPA, CODE OF FEDERAL REGULATIONS, 40 CFR CHAPTER I-PART 50 APPENDIX B, REFERENCE METHOD FOR THE DETERMINATION OF SUSPENDED PARTICULATE MATTER IN THE ATMOSPHERE (HIGH-VOLUME METHOD) REVISED AS OF JULY 1, 2021	81.5	73.5	82.6	75.2	89.7
ฝุ่นละอองขนาดไม่เกิน 10 ไมครอน (PM10)#	ไมโครกรัมต่อลูกบาศก์เมตร	US EPA, CODE OF FEDERAL REGULATIONS, 40 CFR CHAPTER I-PART 50 APPENDIX J, REFERENCE METHOD FOR THE DETERMINATION OF PARTICULATE MATTER AS PM10 IN THE ATMOSPHERE (HIGH-VOLUME METHOD) REVISED AS OF JULY 1, 2021	48.2	44.3	50.1	43.5	50.9
สภาพตัวอย่าง			สมบูรณ์	สมบูรณ์	สมบูรณ์	สมบูรณ์	สมบูรณ์

: อยู่ในขอบข่ายที่ได้รับการรับรอง ISO/IEC 17025 จากหน่วยรับรองระดับประเทศ สำนักงานมาตรฐานผลิตภัณฑ์อุตสาหกรรม

หมายเหตุ
TSP, PM10 : คำนวณเทียบสภาวะมาตรฐานที่อุณหภูมิ 25 องศาเซลเซียส และความดัน 1 บรรยากาศ
* : ชักตัวอย่างเมื่อเวลา 09:30 น. วันที่ 5 เมษายน 2569 ถึงเวลา 09:30 น. วันที่ 6 เมษายน 2569
** : ชักตัวอย่างเมื่อเวลา 09:30 น. วันที่ 6 เมษายน 2569 ถึงเวลา 09:30 น. วันที่ 7 เมษายน 2569
*** : ชักตัวอย่างเมื่อเวลา 09:30 น. วันที่ 7 เมษายน 2569 ถึงเวลา 09:30 น. วันที่ 8 เมษายน 2569
**** : ชักตัวอย่างเมื่อเวลา 09:30 น. วันที่ 8 เมษายน 2569 ถึงเวลา 09:30 น. วันที่ 9 เมษายน 2569
***** : ชักตัวอย่างเมื่อเวลา 09:30 น. วันที่ 9 เมษายน 2569 ถึงเวลา 09:30 น. วันที่ 10 เมษายน 2569

(นางสาวบุษกร เลิศภาณุมาศ)
ผู้ควบคุมห้องปฏิบัติการ

ISO 9001 Quality Management Systems CERTIFIED ISO 14001 Environmental Management CERTIFIED ISO 45001 Occupational Health and Safety Management CERTIFIED
• ห้ามคัดถ่ายใบรายงานผลการวิเคราะห์นี้แต่เพียงบางส่วน โดยไม่ได้รับอนุญาตจากห้องปฏิบัติการเป็นลายลักษณ์อักษร
• ใบรายงานผลนี้รับรองผลเฉพาะกับตัวอย่างที่นำมาทดสอบเท่านั้น

1/1

- End of Analysis Report -

United Analyst and Engineering Consultant Co., Ltd.
3 Soi Udomsuk 41, Sukhumvit Road, Bangchak, Phrakhanong, Bangkok 10260
Tel.0 2763 2828 Fax 0 2763 2800 www.uaeconsultant.com E-mail: uae@uaeconsultant.com

ใบรายงานผลการวิเคราะห์

ชื่อโครงการ : การติดตามตรวจสอบผลกระทบสิ่งแวดล้อม และการตรวจสอบการปฏิบัติตามมาตรการป้องกันและแก้ไขผลกระทบสิ่งแวดล้อม โครงการก่อสร้างรถไฟความเร็วสูง ระยะที่ 1 สายกรุงเทพฯ-นครราชสีมา สัญญาที่ 3-4 ช่วงลำตะคอง-สีคิ้ว และช่วงกุดจิก-โคกกรวด
ชื่อลูกค้า : บริษัท อิตาเลียนไทย ดีเวล็อปเมนต์ จำกัด (มหาชน)
ที่อยู่ : 2034/132-161 อาคารอัลไทยทาวเวอร์ ถนนเพชรบุรีตัดใหม่ แขวงบางกะปิ เขตห้วยขวาง กรุงเทพมหานคร 10310
ข้อมูลผู้ติดต่อ : โทรศัพท์ : 08 8627 1864 อีเมล : environmentpublicrelations@gmail.com
สถานที่ตรวจวัด : โรงพยาบาลส่งเสริมสุขภาพตำบลคลองไผ่ ตำบลคลองไผ่ อำเภอสีคิ้ว จังหวัดนครราชสีมา
ประเภทการตรวจวัด : อากาศในบรรยากาศโดยทั่วไป
วันที่ตรวจวัด : 5-10 เมษายน 2569
เวลาที่ตรวจวัด : *
วิธีตรวจวัด : CHEMILUMINESCENCE
ผู้ตรวจวัด : นายศิรพัชร จงผดุงเกียรติ

วันที่รับตัวอย่าง : 5-10 เมษายน 2569
วันที่วิเคราะห์ : 5-10 เมษายน 2569
วันที่ออกรายงานผล :
เลขที่ใบรายงานผล : 2026-U031113
เลขที่งาน : 2025-000443
หมายเลขปฏิบัติการ : T26AH969-0001 - T26AH969-0005

เวลา *	ผลการวิเคราะห์ (ส่วนในพันล้านส่วน)				
	ก๊าซในโครเจนไดออกไซด์				
	โรงพยาบาลส่งเสริมสุขภาพตำบลคลองไผ่ ตำบลคลองไผ่ อำเภอสีคิ้ว จังหวัดนครราชสีมา				
	5-6 เมษายน 2569	6-7 เมษายน 2569	7-8 เมษายน 2569	8-9 เมษายน 2569	9-10 เมษายน 2569
	T26AH969-0001	T26AH969-0002	T26AH969-0003	T26AH969-0004	T26AH969-0005
07:00-08:00 น.	6.1	15.2	16.0	14.2	15.0
08:00-09:00 น.	7.8	13.2	13.3	12.8	12.6
09:00-10:00 น.	8.8	13.0	11.4	5.9	10.9
10:00-11:00 น.	11.9	11.5	12.2	7.1	11.2
11:00-12:00 น.	8.9	8.3	8.3	5.7	8.1
12:00-13:00 น.	6.9	8.1	8.5	5.4	8.7
13:00-14:00 น.	8.5	10.8	8.4	6.9	9.3
14:00-15:00 น.	8.2	9.2	6.5	4.7	7.9
15:00-16:00 น.	8.1	12.2	11.5	5.6	12.5
16:00-17:00 น.	11.3	11.0	10.7	7.3	12.8
17:00-18:00 น.	13.2	15.4	12.6	10.7	12.4
18:00-19:00 น.	12.5	13.6	9.4	8.2	13.9
19:00-20:00 น.	10.8	14.0	11.7	11.5	14.7
20:00-21:00 น.	12.0	14.2	10.8	13.2	15.2
21:00-22:00 น.	12.6	16.0	9.9	11.6	15.6
22:00-23:00 น.	11.7	13.5	9.6	13.1	15.3
23:00-00:00 น.	12.1	15.8	10.1	13.1	14.7
00:00-01:00 น.	11.9	16.7	10.5	13.5	11.6
01:00-02:00 น.	8.1	13.1	13.0	11.4	10.6
02:00-03:00 น.	6.4	12.8	16.1	7.5	9.1
03:00-04:00 น.	6.6	14.5	13.1	10.4	9.8
04:00-05:00 น.	6.7	13.4	14.6	8.7	11.0
05:00-06:00 น.	9.1	14.0	13.3	11.4	11.2
06:00-07:00 น.	12.4	11.2	11.4	15.0	13.7

(นายศิลา บุรรจงไจรักษ์)
ผู้ควบคุมห้องปฏิบัติการ

• ห้ามคัดถ่ายใบรายงานผลการวิเคราะห์แต่เพียงบางส่วน โดยไม่ได้รับอนุญาตจากห้องปฏิบัติการเป็นลายลักษณ์อักษร
• ใบรายงานผลนี้รับรองผลเฉพาะกับตัวอย่างที่นำมาทดสอบเท่านั้น

- End of Analysis Report -

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ใบรายงานผลการวิเคราะห์

ชื่อโครงการ : การติดตามตรวจสอบผลกระทบสิ่งแวดล้อม และการตรวจสอบการปฏิบัติตามมาตรการป้องกันและแก้ไขผลกระทบสิ่งแวดล้อม โครงการก่อสร้างรถไฟความเร็วสูง ระยะที่ 1 สายกรุงเทพฯ-นครราชสีมา สัญญาที่ 3-4 ช่วงลำตะคอง-สีคิ้ว และช่วงกุดจิก-โคกกรวด
ชื่อลูกค้า : บริษัท อิตาเลียนไทย ดีเวล็อปเมนต์ จำกัด (มหาชน)
ที่อยู่ : 2034/132-161 อาคารอัลไทยทาวเวอร์ ถนนเพชรบุรีตัดใหม่ แขวงบางกะปิ เขตห้วยขวาง กรุงเทพมหานคร 10310
ข้อมูลผู้ติดต่อ : โทรศัพท์ : 08 8627 1864 อีเมล : environmentpublicrelations@gmail.com
สถานที่ตรวจวัด : โรงพยาบาลส่งเสริมสุขภาพตำบลโคกกรวด ตำบลโคกกรวด อำเภอเมืองนครราชสีมา จังหวัดนครราชสีมา
ประเภทการตรวจวัด : อากาศในบรรยากาศโดยทั่วไป
วันที่ตรวจวัด : 5-10 เมษายน 2569
เวลาที่ตรวจวัด : *
วิธีตรวจวัด : CHEMILUMINESCENCE
ผู้ตรวจวัด : นายศิรพัชร จงผดุงเกียรติ

วันที่รับตัวอย่าง : 5-10 เมษายน 2569
วันที่วิเคราะห์ : 5-10 เมษายน 2569
วันที่ออกรายงานผล :
เลขที่ใบรายงานผล : 2026-U031114
เลขที่งาน : 2025-000443
หมายเลขปฏิบัติการ : T26AH969-0006 - T26AH969-0010

เวลา *	ผลการวิเคราะห์ (ส่วนในพันล้านส่วน)				
	ก๊าซในโครเจนไดออกไซด์				
	รพ.สต.โคกกรวด ต.โคกกรวด อ.เมือง จ.นครราชสีมา				
	5-6 เมษายน 2569	6-7 เมษายน 2569	7-8 เมษายน 2569	8-9 เมษายน 2569	9-10 เมษายน 2569
	T26AH969-0006	T26AH969-0007	T26AH969-0008	T26AH969-0009	T26AH969-0010
07:00-08:00 น.	19.8	15.4	17.6	20.2	17.2
08:00-09:00 น.	19.4	20.1	19.5	18.7	17.6
09:00-10:00 น.	14.3	14.3	14.7	14.1	12.9
10:00-11:00 น.	12.3	10.5	12.9	13.2	10.5
11:00-12:00 น.	7.5	8.4	10.2	10.8	7.4
12:00-13:00 น.	9.7	7.8	10.6	11.0	8.7
13:00-14:00 น.	11.3	9.9	12.4	11.9	12.6
14:00-15:00 น.	9.5	8.6	13.8	10.5	10.4
15:00-16:00 น.	10.2	12.4	15.4	13.1	15.1
16:00-17:00 น.	12.1	13.4	16.5	17.5	15.2
17:00-18:00 น.	13.2	14.8	15.4	14.8	17.1
18:00-19:00 น.	14.3	13.9	17.0	19.1	16.0
19:00-20:00 น.	11.6	18.1	17.8	16.8	14.3
20:00-21:00 น.	15.1	17.3	17.2	16.2	15.0
21:00-22:00 น.	17.1	14.6	18.3	19.0	15.6
22:00-23:00 น.	15.0	18.3	18.3	16.3	14.6
23:00-00:00 น.	19.0	13.4	18.9	17.6	12.2
00:00-01:00 น.	17.9	13.4	21.7	16.1	14.0
01:00-02:00 น.	19.6	7.0	22.0	15.2	14.9
02:00-03:00 น.	15.4	7.7	20.0	16.1	13.4
03:00-04:00 น.	15.4	9.2	17.6	15.7	10.8
04:00-05:00 น.	15.0	9.2	19.6	14.7	10.5
05:00-06:00 น.	13.9	11.8	20.6	12.3	10.6
06:00-07:00 น.	14.3	13.5	13.9	18.8	18.1

(นายศิลา บุรรจงไจรักษ์)
ผู้ควบคุมห้องปฏิบัติการ

• ห้ามคัดถ่ายใบรายงานผลการวิเคราะห์แต่เพียงบางส่วน โดยไม่ได้รับอนุญาตจากห้องปฏิบัติการเป็นลายลักษณ์อักษร
• ใบรายงานผลนี้รับรองผลเฉพาะกับตัวอย่างที่นำมาทดสอบเท่านั้น

- End of Analysis Report -

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ใบรายงานผลการวิเคราะห์

ชื่อโครงการ : การติดตามตรวจสอบผลกระทบสิ่งแวดล้อม และการตรวจสอบการปฏิบัติตามมาตรการป้องกันและแก้ไขผลกระทบสิ่งแวดล้อม โครงการก่อสร้างรถไฟความเร็วสูง ระยะที่ 1 สายกรุงเทพฯ-นครราชสีมา สัญญาที่ 3-4 ช่วงลำตะคอง-สีคิ้ว และช่วงกุดจิก-โคกกรวด
ชื่อลูกค้า : บริษัท อิตาเลียนไทย ดีเวล็อปเมนต์ จำกัด (มหาชน)
ที่อยู่ : 2034/132-161 อาคารอัลไทยทาวเวอร์ ถนนเพชรบุรีตัดใหม่ แขวงบางกะปิ เขตห้วยขวาง กรุงเทพมหานคร 10310
ข้อมูลผู้ติดต่อ : โทรศัพท์ : 0873051608 อีเมล : environmentpublicrelations@gmail.com
สถานที่ตรวจวัด : โรงพยาบาลส่งเสริมสุขภาพตำบลคลองไผ่ ตำบลคลองไผ่ อำเภอสีคิ้ว จังหวัดนครราชสีมา
ประเภทการตรวจวัด : อากาศในบรรยากาศโดยทั่วไป
วันที่ตรวจวัด : 5-10 เมษายน 2569
เวลาที่ตรวจวัด : *
วิธีตรวจวัด : NON-DISPERSIVE INFRARED DETECTION
ผู้ตรวจวัด : นายศิรพัชร จงผดุงเกียรติ

วันที่รับตัวอย่าง : 5-10 เมษายน 2569
วันที่วิเคราะห์ : 5-10 เมษายน 2569
วันที่ออกรายการผล : 21 เมษายน 2569
เลขที่ใบรายงานผล : 2026-U031110
เลขที่งาน : 2025-000443
หมายเลขปฏิบัติการ : T26AH969-0001-T26AH969-0005

เวลา*	ผลการวิเคราะห์ (ส่วนในล้านส่วน)									
	ก๊าซคาร์บอนมอนอกไซด์									
	โรงพยาบาลส่งเสริมสุขภาพตำบลคลองไผ่ ตำบลคลองไผ่ อำเภอสีคิ้ว จังหวัดนครราชสีมา									
	5-6 เมษายน 2569		6-7 เมษายน 2569		7-8 เมษายน 2569		8-9 เมษายน 2569		9-10 เมษายน 2569	
	T26AH969-0001		T26AH969-0002		T26AH969-0003		T26AH969-0004		T26AH969-0005	
	1 hour	8 hours	1 hour	8 hours	1 hour	8 hours	1 hour	8 hours	1 hour	8 hours
07:00-08:00 น.	1.86	-	1.86	-	1.75	-	1.59	-	1.57	-
08:00-09:00 น.	1.79	-	1.64	-	1.66	-	1.77	-	1.82	-
09:00-10:00 น.	1.50	-	1.85	-	1.37	-	1.39	-	1.44	-
10:00-11:00 น.	1.17	-	1.37	-	1.27	-	1.14	-	1.18	-
11:00-12:00 น.	0.86	-	1.18	-	0.94	-	0.96	-	0.96	-
12:00-13:00 น.	0.97	-	1.20	-	0.96	-	0.93	-	0.89	-
13:00-14:00 น.	1.24	-	1.40	-	1.25	-	1.26	-	1.11	-
14:00-15:00 น.	0.89	1.28	1.08	1.45	1.01	1.28	1.35	1.30	1.06	1.25
15:00-16:00 น.	1.31	-	1.49	-	1.23	-	1.62	-	1.07	-
16:00-17:00 น.	1.12	-	1.49	-	1.46	-	1.68	-	1.37	-
17:00-18:00 น.	1.52	-	1.63	-	1.33	-	1.90	-	1.58	-
18:00-19:00 น.	1.45	-	1.60	-	1.44	-	1.59	-	1.51	-
19:00-20:00 น.	1.53	-	1.48	-	1.45	-	1.64	-	1.66	-
20:00-21:00 น.	1.54	-	1.63	-	1.44	-	1.78	-	1.56	-
21:00-22:00 น.	1.51	-	1.78	-	1.39	-	1.60	-	1.67	-
22:00-23:00 น.	1.48	1.43	1.76	1.61	1.42	1.40	1.55	1.67	1.86	1.54
23:00-00:00 น.	1.53	-	1.57	-	1.40	-	1.29	-	1.72	-
00:00-01:00 น.	1.61	-	1.49	-	1.54	-	1.37	-	1.66	-
01:00-02:00 น.	1.62	-	1.59	-	1.42	-	1.24	-	1.54	-
02:00-03:00 น.	1.50	-	1.43	-	1.61	-	1.22	-	1.61	-
03:00-04:00 น.	1.55	-	1.49	-	1.62	-	1.18	-	1.73	-
04:00-05:00 น.	1.66	-	1.42	-	1.52	-	1.25	-	1.52	-
05:00-06:00 น.	1.68	-	1.58	-	1.79	-	1.37	-	1.65	-
06:00-07:00 น.	1.51	1.58	1.56	1.52	1.55	1.55	1.47	1.30	1.69	1.64

(นายศิลา บรรจงไจรักษ์)
ผู้ควบคุมห้องปฏิบัติการ

• ห้ามคัดถ่ายใบรายงานผลการวิเคราะห์แต่เพียงบางส่วน โดยไม่ได้รับอนุญาตจากห้องปฏิบัติการเป็นลายลักษณ์อักษร
• ใบรายงานผลนี้รับรองผลเฉพาะกับตัวอย่างที่นำมาทดสอบเท่านั้น

- End of Analysis Report -

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ใบรายงานผลการวิเคราะห์

ชื่อโครงการ : การติดตามตรวจสอบผลกระทบสิ่งแวดล้อม และการตรวจสอบการปฏิบัติตามมาตรการป้องกันและแก้ไขผลกระทบสิ่งแวดล้อม โครงการก่อสร้างรถไฟความเร็วสูง ระยะที่ 1 สายกรุงเทพฯ-นครราชสีมา สัญญาที่ 3-4 ช่วงลำตะคอง-สีคิ้ว และช่วงกุดจิก-โคกกรวด
ชื่อลูกค้า : บริษัท อิตาเลียนไทย ดีเวล็อปเมนต์ จำกัด (มหาชน)
ที่อยู่ : 2034/132-161 อาคารอัลไทยทาวเวอร์ ถนนเพชรบุรีตัดใหม่ แขวงบางกะปิ เขตห้วยขวาง กรุงเทพมหานคร 10310
ข้อมูลผู้ติดต่อ : โทรศัพท์ : 0873051608 อีเมล : environmentpublicrelations@gmail.com
สถานที่ตรวจวัด : โรงพยาบาลส่งเสริมสุขภาพตำบลโคกกรวด ตำบลโคกกรวด อำเภอเมืองนครราชสีมา จังหวัดนครราชสีมา
ประเภทการตรวจวัด : อากาศในบรรยากาศโดยทั่วไป
วันที่ตรวจวัด : 5-10 เมษายน 2569
เวลาที่ตรวจวัด : *
วิธีตรวจวัด : NON-DISPERSIVE INFRARED DETECTION
ผู้ตรวจวัด : นายศิรพัชร จงผดุงเกียรติ

วันที่รับตัวอย่าง : 5-10 เมษายน 2569
วันที่วิเคราะห์ : 5-10 เมษายน 2569
วันที่ออกรายการผล : 21 เมษายน 2569
เลขที่ใบรายงานผล : 2026-U031111
เลขที่งาน : 2025-000443
หมายเลขปฏิบัติการ : T26AH969-0006-T26AH969-0010

เวลา*	ผลการวิเคราะห์ (ส่วนในล้านส่วน)									
	ก๊าซคาร์บอนมอนอกไซด์									
	โรงพยาบาลส่งเสริมสุขภาพตำบลโคกกรวด ตำบลโคกกรวด อำเภอเมืองนครราชสีมา จังหวัดนครราชสีมา									
	5-6 เมษายน 2569		6-7 เมษายน 2569		7-8 เมษายน 2569		8-9 เมษายน 2569		9-10 เมษายน 2569	
	T26AH969-0006		T26AH969-0007		T26AH969-0008		T26AH969-0009		T26AH969-0010	
	1 hour	8 hours	1 hour	8 hours	1 hour	8 hours	1 hour	8 hours	1 hour	8 hours
07:00-08:00 น.	1.62	-	1.84	-	1.79	-	1.72	-	1.53	-
08:00-09:00 น.	1.49	-	1.59	-	1.72	-	1.85	-	1.74	-
09:00-10:00 น.	1.24	-	1.03	-	1.19	-	1.43	-	1.19	-
10:00-11:00 น.	1.38	-	1.11	-	1.24	-	1.33	-	1.22	-
11:00-12:00 น.	1.10	-	0.83	-	0.99	-	1.10	-	0.96	-
12:00-13:00 น.	1.07	-	0.84	-	1.00	-	1.15	-	0.92	-
13:00-14:00 น.	1.19	-	1.26	-	1.18	-	1.19	-	1.19	-
14:00-15:00 น.	0.89	1.25	1.31	1.23	0.85	1.24	0.98	1.34	0.98	1.22
15:00-16:00 น.	1.38	-	1.32	-	1.28	-	1.18	-	1.21	-
16:00-17:00 น.	1.36	-	1.50	-	1.23	-	1.17	-	1.19	-
17:00-18:00 น.	1.53	-	1.43	-	1.37	-	1.41	-	1.44	-
18:00-19:00 น.	1.41	-	1.39	-	1.51	-	1.41	-	1.48	-
19:00-20:00 น.	1.33	-	1.38	-	1.38	-	1.50	-	1.52	-
20:00-21:00 น.	1.41	-	1.37	-	1.69	-	1.57	-	1.55	-
21:00-22:00 น.	1.29	-	1.28	-	1.63	-	1.57	-	1.66	-
22:00-23:00 น.	1.18	1.36	1.33	1.38	1.74	1.48	1.52	1.42	1.59	1.46
23:00-00:00 น.	1.22	-	1.36	-	1.59	-	1.61	-	1.49	-
00:00-01:00 น.	1.53	-	1.23	-	1.41	-	1.32	-	1.25	-
01:00-02:00 น.	1.20	-	1.20	-	1.36	-	1.28	-	1.10	-
02:00-03:00 น.	1.61	-	1.03	-	1.25	-	1.12	-	0.99	-
03:00-04:00 น.	1.75	-	1.09	-	1.38	-	1.12	-	1.22	-
04:00-05:00 น.	1.58	-	1.14	-	1.40	-	1.14	-	1.00	-
05:00-06:00 น.	1.57	-	1.05	-	1.40	-	0.94	-	1.27	-
06:00-07:00 น.	1.54	1.50	1.65	1.22	1.46	1.41	1.69	1.28	1.60	1.24

(นายศิลา บรรจงไจรักษ์)
ผู้ควบคุมห้องปฏิบัติการ

• ห้ามคัดถ่ายใบรายงานผลการวิเคราะห์แต่เพียงบางส่วน โดยไม่ได้รับอนุญาตจากห้องปฏิบัติการเป็นลายลักษณ์อักษร
• ใบรายงานผลนี้รับรองผลเฉพาะกับตัวอย่างที่นำมาทดสอบเท่านั้น

- End of Analysis Report -

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Tel.0 2763 2828 Fax 0 2763 2800 www.uaeconsultant.com E-mail: uae@uaeconsultant.com

ใบรายงานผลการวิเคราะห์

ชื่อโครงการ : การติดตามตรวจสอบผลกระทบสิ่งแวดล้อม และการตรวจสอบการปฏิบัติตามมาตรการป้องกันและแก้ไขผลกระทบสิ่งแวดล้อม โครงการก่อสร้างระบบไฟความเร็วสูง ระยะที่ 1 สายกรุงเทพฯ-นครราชสีมา สัญญาที่ 3-4 ช่วงสำตะคอง-สีคิ้ว และช่วงกุดจิก-โคกกรวด
ชื่อลูกค้า : บริษัท อีตาเลียนไทย ดีเวล็อปเมนต์ จำกัด (มหาชน)
ที่อยู่ : 2034/132-161 อาคารอีตัลไทยทาวเวอร์ ถนนเพชรบุรีตัดใหม่ แขวงบางกะปิ เขตห้วยขวาง กรุงเทพมหานคร 10310
ข้อมูลผู้ติดต่อ : โทรศัพท์ : 08 8627 1864 อีเมล : environmentpublicrelations@gmail.com
สถานที่ตรวจวัด : โรงพยาบาลส่งเสริมสุขภาพตำบลคลองไผ่ ตำบลคลองไผ่ อำเภอสีคิ้ว จังหวัดนครราชสีมา
ประเภทการตรวจวัด : อากาศในบรรยากาศโดยทั่วไป
วันที่ตรวจวัด : 5-10 เมษายน 2569
เวลาที่ตรวจวัด : *
วิธีตรวจวัด : FLAME IONIZATION DETECTION
ผู้ตรวจวัด : นายศิรพัชร จงผดุงเกียรติ

วันที่รับตัวอย่าง : 5-10 เมษายน 2569
วันที่วิเคราะห์ : 5-10 เมษายน 2569
วันที่ออกรายงานผล : 21 เมษายน 2569
เลขที่ใบรายงานผล : 2026-U031115
เลขที่งาน : 2025-000443
หมายเลขปฏิบัติการ : T26AH969-0001 - T26AH969-0005

วันที่	เวลา *	ผลการวิเคราะห์ (ส่วนในล้านส่วน)
		ปริมาณไฮโดรคาร์บอนรวม
		โรงพยาบาลส่งเสริมสุขภาพตำบลคลองไผ่ ตำบลคลองไผ่ อำเภอสีคิ้ว จังหวัดนครราชสีมา
5-6 เมษายน 2569	07:00-08:00 น.	1.77
T26AH969-0001	08:00-09:00 น.	1.65
	09:00-10:00 น.	1.62
	10:00-11:00 น.	1.64
	11:00-12:00 น.	1.68
	12:00-13:00 น.	1.73
	13:00-14:00 น.	1.82
	14:00-15:00 น.	1.87
	15:00-16:00 น.	1.96
	16:00-17:00 น.	2.02
	17:00-18:00 น.	2.15
	18:00-19:00 น.	2.21
	19:00-20:00 น.	2.26
	20:00-21:00 น.	2.16
	21:00-22:00 น.	2.09
	22:00-23:00 น.	2.03
	23:00-00:00 น.	2.18
	00:00-01:00 น.	2.41
	01:00-02:00 น.	2.63
	02:00-03:00 น.	2.63
	03:00-04:00 น.	2.50
	04:00-05:00 น.	2.39
	05:00-06:00 น.	2.46
	06:00-07:00 น.	2.54
	ค่าเฉลี่ย 24 ชั่วโมง	**2.10**

• ห้ามคัดถ่ายใบรายงานผลการวิเคราะห์แต่เพียงบางส่วน โดยไม่ได้รับอนุญาตจากห้องปฏิบัติการเป็นลายลักษณ์อักษร
• ใบรายงานผลนี้รับรองผลเฉพาะกับตัวอย่างที่นำมาทดสอบเท่านั้น

United Analyst and Engineering Consultant Co., Ltd.
3 Soi Udomsuk 41, Sukhumvit Road, Bangchak, Phrakhanong, Bangkok 10260
Tel.0 2763 2828 Fax 0 2763 2800 www.uaeconsultant.com E-mail: uae@uaeconsultant.com

วันที่	เวลา *	ผลการวิเคราะห์ (ส่วนในล้านส่วน)
		ปริมาณไฮโดรคาร์บอนรวม
		โรงพยาบาลส่งเสริมสุขภาพตำบลคลองไผ่ ตำบลคลองไผ่ อำเภอสีคิ้ว จังหวัดนครราชสีมา
6-7 เมษายน 2569	07:00-08:00 น.	2.46
T26AH969-0002	08:00-09:00 น.	2.15
	09:00-10:00 น.	1.83
	10:00-11:00 น.	1.66
	11:00-12:00 น.	1.68
	12:00-13:00 น.	1.78
	13:00-14:00 น.	2.04
	14:00-15:00 น.	2.32
	15:00-16:00 น.	2.67
	16:00-17:00 น.	2.70
	17:00-18:00 น.	2.68
	18:00-19:00 น.	2.47
	19:00-20:00 น.	2.45
	20:00-21:00 น.	2.38
	21:00-22:00 น.	2.55
	22:00-23:00 น.	2.65
	23:00-00:00 น.	2.66
	00:00-01:00 น.	2.41
	01:00-02:00 น.	2.13
	02:00-03:00 น.	2.01
	03:00-04:00 น.	2.02
	04:00-05:00 น.	2.13
	05:00-06:00 น.	2.14
	06:00-07:00 น.	2.07
	ค่าเฉลี่ย 24 ชั่วโมง	**2.25**

• ห้ามคัดถ่ายใบรายงานผลการวิเคราะห์แต่เพียงบางส่วน โดยไม่ได้รับอนุญาตจากห้องปฏิบัติการเป็นลายลักษณ์อักษร
• ใบรายงานผลนี้รับรองผลเฉพาะกับตัวอย่างที่นำมาทดสอบเท่านั้น

United Analyst and Engineering Consultant Co., Ltd.
3 Soi Udomsuk 41, Sukhumvit Road, Bangchak, Phrakhanong, Bangkok 10260
Tel.0 2763 2828 Fax 0 2763 2800 www.uaeconsultant.com E-mail: uae@uaeconsultant.com

วันที่	เวลา *	ผลการวิเคราะห์ (ส่วนในล้านส่วน)
		ปริมาณไฮโดรคาร์บอนรวม
		โรงพยาบาลส่งเสริมสุขภาพตำบลคลองไผ่ ตำบลคลองไผ่ อำเภอสีคิ้ว จังหวัดนครราชสีมา
7-8 เมษายน 2569	07:00-08:00 น.	1.86
T26AH969-0003	08:00-09:00 น.	1.67
	09:00-10:00 น.	1.54
	10:00-11:00 น.	1.51
	11:00-12:00 น.	1.53
	12:00-13:00 น.	1.64
	13:00-14:00 น.	1.88
	14:00-15:00 น.	2.19
	15:00-16:00 น.	2.57
	16:00-17:00 น.	2.75
	17:00-18:00 น.	2.87
	18:00-19:00 น.	2.69
	19:00-20:00 น.	2.51
	20:00-21:00 น.	2.19
	21:00-22:00 น.	2.01
	22:00-23:00 น.	1.92
	23:00-00:00 น.	1.96
	00:00-01:00 น.	1.98
	01:00-02:00 น.	1.95
	02:00-03:00 น.	1.94
	03:00-04:00 น.	1.99
	04:00-05:00 น.	2.14
	05:00-06:00 น.	2.25
	06:00-07:00 น.	2.20
	ค่าเฉลี่ย 24 ชั่วโมง	**2.07**

• ห้ามคัดถ่ายใบรายงานผลการวิเคราะห์แต่เพียงบางส่วน โดยไม่ได้รับอนุญาตจากห้องปฏิบัติการเป็นลายลักษณ์อักษร
• ใบรายงานผลนี้รับรองผลเฉพาะกับตัวอย่างที่นำมาทดสอบเท่านั้น

United Analyst and Engineering Consultant Co., Ltd.
3 Soi Udomsuk 41, Sukhumvit Road, Bangchak, Phrakhanong, Bangkok 10260
Tel.0 2763 2828 Fax 0 2763 2800 www.uaeconsultant.com E-mail: uae@uaeconsultant.com

วันที่	เวลา *	ผลการวิเคราะห์ (ส่วนในล้านส่วน)
		ปริมาณไฮโดรคาร์บอนรวม
		โรงพยาบาลส่งเสริมสุขภาพตำบลคลองไผ่ ตำบลคลองไผ่ อำเภอสีคิ้ว จังหวัดนครราชสีมา
8-9 เมษายน 2569	07:00-08:00 น.	1.97
T26AH969-0004	08:00-09:00 น.	1.71
	09:00-10:00 น.	1.57
	10:00-11:00 น.	1.56
	11:00-12:00 น.	1.62
	12:00-13:00 น.	1.72
	13:00-14:00 น.	1.83
	14:00-15:00 น.	1.90
	15:00-16:00 น.	1.93
	16:00-17:00 น.	1.92
	17:00-18:00 น.	1.93
	18:00-19:00 น.	1.95
	19:00-20:00 น.	1.96
	20:00-21:00 น.	1.95
	21:00-22:00 น.	1.93
	22:00-23:00 น.	1.95
	23:00-00:00 น.	1.93
	00:00-01:00 น.	1.92
	01:00-02:00 น.	1.88
	02:00-03:00 น.	1.86
	03:00-04:00 น.	1.89
	04:00-05:00 น.	2.01
	05:00-06:00 น.	2.13
	06:00-07:00 น.	2.17
	ค่าเฉลี่ย 24 ชั่วโมง	**1.88**

• ห้ามคัดถ่ายใบรายงานผลการวิเคราะห์แต่เพียงบางส่วน โดยไม่ได้รับอนุญาตจากห้องปฏิบัติการเป็นลายลักษณ์อักษร
• ใบรายงานผลนี้รับรองผลเฉพาะกับตัวอย่างที่นำมาทดสอบเท่านั้น

United Analyst and Engineering Consultant Co., Ltd.
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Tel.0 2763 2828 Fax 0 2763 2800 www.uaeconsultant.com E-mail: uae@uaeconsultant.com

วันที่	เวลา *	ผลการวิเคราะห์ (ส่วนในล้านส่วน)
		ปริมาณไฮโดรคาร์บอนรวม
		โรงพยาบาลส่งเสริมสุขภาพตำบลคลองไผ่ ตำบลคลองไผ่ อำเภอสีคิ้ว จังหวัดนครราชสีมา
9-10 เมษายน 2569	07:00-08:00 น.	2.02
T26AH969-0005	08:00-09:00 น.	1.86
	09:00-10:00 น.	1.72
	10:00-11:00 น.	1.69
	11:00-12:00 น.	1.71
	12:00-13:00 น.	1.72
	13:00-14:00 น.	1.80
	14:00-15:00 น.	1.86
	15:00-16:00 น.	1.98
	16:00-17:00 น.	2.03
	17:00-18:00 น.	2.06
	18:00-19:00 น.	2.00
	19:00-20:00 น.	1.94
	20:00-21:00 น.	1.90
	21:00-22:00 น.	1.88
	22:00-23:00 น.	1.91
	23:00-00:00 น.	1.92
	00:00-01:00 น.	1.93
	01:00-02:00 น.	1.90
	02:00-03:00 น.	1.92
	03:00-04:00 น.	2.00
	04:00-05:00 น.	2.17
	05:00-06:00 น.	2.23
	06:00-07:00 น.	2.17
	ค่าเฉลี่ย 24 ชั่วโมง	**1.93**

(นายศิลา บรรจงไจรักษ์)
ผู้ควบคุมห้องปฏิบัติการ

• ห้ามคัดถ่ายใบรายงานผลการวิเคราะห์แต่เพียงบางส่วน โดยไม่ได้รับอนุญาตจากห้องปฏิบัติการเป็นลายลักษณ์อักษร
• ใบรายงานผลนี้รับรองผลเฉพาะกับตัวอย่างที่นำมาทดสอบเท่านั้น

2026-U031115

- End of Analysis Report -

United Analyst and Engineering Consultant Co., Ltd.
3 Soi Udomsuk 41, Sukhumvit Road, Bangchak, Phrakhanong, Bangkok 10260
Tel.0 2763 2828 Fax 0 2763 2800 www.uaeconsultant.com E-mail: uae@uaeconsultant.com

ใบรายงานผลการวิเคราะห์

ชื่อโครงการ	: การติดตามตรวจสอบผลกระทบสิ่งแวดล้อม และการตรวจสอบการปฏิบัติตามมาตรการป้องกันและแก้ไขผลกระทบสิ่งแวดล้อม โครงการก่อสร้างระโนด-สงขลา ระยะที่ 1 สายกรุงเทพฯ-นครราชสีมา สัญญาที่ 3-4 ช่วงลำตะคอง-สีคิ้ว และช่วงกุดจิก-โคกกรวด		
ชื่อลูกค้า	: บริษัท อิตาเลียนไทย ดีเวล็อปเมนต์ จำกัด (มหาชน)		
ที่อยู่	: 2034/132-161 อาคารอิตัลไทยทาวเวอร์ ถนนเพชรบุรีตัดใหม่ แขวงบางกะปิ เขตห้วยขวาง กรุงเทพมหานคร 10310		
ข้อมูลผู้ติดต่อ	: โทรศัพท์ : 08 8627 1864 อีเมล : environmentpublicrelations@gmail.com		
สถานที่ตรวจวัด	: โรงพยาบาลส่งเสริมสุขภาพตำบลโคกกรวด ตำบลโคกกรวด อำเภอเมืองนครราชสีมา จังหวัดนครราชสีมา		
ประเภทการตรวจวัด	: อากาศในบรรยากาศโดยทั่วไป	**วันที่รับตัวอย่าง**	: 5-10 เมษายน 2569
วันที่ตรวจวัด	: 5-10 เมษายน 2569	**วันที่วิเคราะห์**	: 5-10 เมษายน 2569
เวลาที่ตรวจวัด	: *	**วันที่ออกรายงานผล**	: 21 เมษายน 2569
วิธีตรวจวัด	: FLAME IONIZATION DETECTION	**เลขที่ใบรายงานผล**	: 2026-U031116
ผู้ตรวจวัด	: นายศิรพัชร จงผดุงเกียรติ์	**เลขที่งาน**	: 2025-000443
		หมายเลขปฏิบัติการ	: T26AH969-0006 - T26AH969-0010

วันที่	เวลา *	ผลการวิเคราะห์ (ส่วนในล้านส่วน)
		ปริมาณไฮโดรคาร์บอนรวม
		โรงพยาบาลส่งเสริมสุขภาพตำบลโคกกรวด ตำบลโคกกรวด อำเภอเมืองนครราชสีมา จังหวัดนครราชสีมา
5-6 เมษายน 2569	07:00-08:00 น.	1.84
T26AH969-0006	08:00-09:00 น.	1.71
	09:00-10:00 น.	1.59
	10:00-11:00 น.	1.52
	11:00-12:00 น.	1.54
	12:00-13:00 น.	1.61
	13:00-14:00 น.	1.72
	14:00-15:00 น.	1.79
	15:00-16:00 น.	1.87
	16:00-17:00 น.	1.91
	17:00-18:00 น.	1.99
	18:00-19:00 น.	2.05
	19:00-20:00 น.	2.03
	20:00-21:00 น.	1.97
	21:00-22:00 น.	1.88
	22:00-23:00 น.	1.86
	23:00-00:00 น.	1.86
	00:00-01:00 น.	1.85
	01:00-02:00 น.	1.81
	02:00-03:00 น.	1.79
	03:00-04:00 น.	1.81
	04:00-05:00 น.	1.92
	05:00-06:00 น.	1.97
	06:00-07:00 น.	1.98
	ค่าเฉลี่ย 24 ชั่วโมง	**1.83**

• ห้ามคัดถ่ายใบรายงานผลการวิเคราะห์แต่เพียงบางส่วน โดยไม่ได้รับอนุญาตจากห้องปฏิบัติการเป็นลายลักษณ์อักษร
• ใบรายงานผลนี้รับรองผลเฉพาะกับตัวอย่างที่นำมาทดสอบเท่านั้น

United Analyst and Engineering Consultant Co., Ltd.
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Tel.0 2763 2828 Fax 0 2763 2800 www.uaeconsultant.com E-mail: uae@uaeconsultant.com

วันที่	เวลา *	ผลการวิเคราะห์ (ส่วนในล้านส่วน)
		ปริมาณไฮโดรคาร์บอนรวม
		โรงพยาบาลส่งเสริมสุขภาพตำบลโคกกรวด ตำบลโคกกรวด อำเภอเมืองนครราชสีมา จังหวัดนครราชสีมา
6-7 เมษายน 2569	07:00-08:00 น.	1.85
T26AH969-0007	08:00-09:00 น.	1.72
	09:00-10:00 น.	1.61
	10:00-11:00 น.	1.60
	11:00-12:00 น.	1.65
	12:00-13:00 น.	1.69
	13:00-14:00 น.	1.74
	14:00-15:00 น.	1.72
	15:00-16:00 น.	1.79
	16:00-17:00 น.	1.84
	17:00-18:00 น.	1.92
	18:00-19:00 น.	1.95
	19:00-20:00 น.	2.01
	20:00-21:00 น.	2.05
	21:00-22:00 น.	2.03
	22:00-23:00 น.	1.97
	23:00-00:00 น.	1.94
	00:00-01:00 น.	1.95
	01:00-02:00 น.	2.00
	02:00-03:00 น.	2.01
	03:00-04:00 น.	2.04
	04:00-05:00 น.	2.03
	05:00-06:00 น.	2.01
	06:00-07:00 น.	1.94
	ค่าเฉลี่ย 24 ชั่วโมง	**1.88**

• ห้ามคัดถ่ายใบรายงานผลการวิเคราะห์แต่เพียงบางส่วน โดยไม่ได้รับอนุญาตจากห้องปฏิบัติการเป็นลายลักษณ์อักษร
• ใบรายงานผลนี้รับรองผลเฉพาะกับตัวอย่างที่นำมาทดสอบเท่านั้น

2026-U031116

United Analyst and Engineering Consultant Co., Ltd.
3 Soi Udomsuk 41, Sukhumvit Road, Bangchak, Phrakhanong, Bangkok 10260
Tel.0 2763 2828 Fax 0 2763 2800 www.uaeconsultant.com E-mail: uae@uaeconsultant.com

วันที่	เวลา *	ผลการวิเคราะห์ (ส่วนในล้านส่วน)
		ปริมาณไฮโดรคาร์บอนรวม
		โรงพยาบาลส่งเสริมสุขภาพตำบลโคกกรวด ตำบลโคกกรวด อำเภอเมืองนครราชสีมา จังหวัดนครราชสีมา
7-8 เมษายน 2569	07:00-08:00 น.	1.84
T26AH969-0008	08:00-09:00 น.	1.73
	09:00-10:00 น.	1.66
	10:00-11:00 น.	1.62
	11:00-12:00 น.	1.62
	12:00-13:00 น.	1.63
	13:00-14:00 น.	1.73
	14:00-15:00 น.	1.81
	15:00-16:00 น.	1.94
	16:00-17:00 น.	1.97
	17:00-18:00 น.	2.01
	18:00-19:00 น.	2.01
	19:00-20:00 น.	1.99
	20:00-21:00 น.	1.97
	21:00-22:00 น.	1.91
	22:00-23:00 น.	1.88
	23:00-00:00 น.	1.86
	00:00-01:00 น.	1.86
	01:00-02:00 น.	1.91
	02:00-03:00 น.	1.91
	03:00-04:00 น.	1.95
	04:00-05:00 น.	2.01
	05:00-06:00 น.	2.10
	06:00-07:00 น.	2.07
	ค่าเฉลี่ย 24 ชั่วโมง	**1.87**

• ห้ามคัดถ่ายใบรายงานผลการวิเคราะห์แต่เพียงบางส่วน โดยไม่ได้รับอนุญาตจากห้องปฏิบัติการเป็นลายลักษณ์อักษร
• ใบรายงานผลนี้รับรองผลเฉพาะกับตัวอย่างที่นำมาทดสอบเท่านั้น

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Tel.0 2763 2828 Fax 0 2763 2800 www.uaeconsultant.com E-mail: uae@uaeconsultant.com

วันที่	เวลา *	ผลการวิเคราะห์ (ส่วนในล้านส่วน)
		ปริมาณไฮโดรคาร์บอนรวม
		โรงพยาบาลส่งเสริมสุขภาพตำบลโคกกรวด ตำบลโคกกรวด อำเภอเมืองนครราชสีมา จังหวัดนครราชสีมา
8-9 เมษายน 2569 T26AH969-0009	07:00-08:00 น.	1.90
	08:00-09:00 น.	1.72
	09:00-10:00 น.	1.57
	10:00-11:00 น.	1.52
	11:00-12:00 น.	1.55
	12:00-13:00 น.	1.67
	13:00-14:00 น.	1.79
	14:00-15:00 น.	1.83
	15:00-16:00 น.	1.93
	16:00-17:00 น.	1.97
	17:00-18:00 น.	2.00
	18:00-19:00 น.	1.94
	19:00-20:00 น.	1.89
	20:00-21:00 น.	1.86
	21:00-22:00 น.	1.88
	22:00-23:00 น.	1.93
	23:00-00:00 น.	2.00
	00:00-01:00 น.	2.01
	01:00-02:00 น.	2.03
	02:00-03:00 น.	2.04
	03:00-04:00 น.	2.12
	04:00-05:00 น.	2.13
	05:00-06:00 น.	2.14
	06:00-07:00 น.	2.04
	ค่าเฉลี่ย 24 ชั่วโมง	**1.89**

(นายศิลา บรรจงโจรักษ์)
ผู้ควบคุมห้องปฏิบัติการ

• ห้ามคัดถ่ายใบรายงานผลการวิเคราะห์แต่เพียงบางส่วน โดยไม่ได้รับอนุญาตจากห้องปฏิบัติการเป็นลายลักษณ์อักษร
• ใบรายงานผลนี้รับรองผลเฉพาะกับตัวอย่างที่นำมาทดสอบเท่านั้น

2026-U031116

United Analyst and Engineering Consultant Co., Ltd.
3 Soi Udomsuk 41, Sukhumvit Road, Bangchak, Phrakhanong, Bangkok 10260
Tel.0 2763 2828 Fax 0 2763 2800 www.uaeconsultant.com E-mail: uae@uaeconsultant.com

วันที่	เวลา *	ผลการวิเคราะห์ (ส่วนในล้านส่วน)
		ปริมาณไฮโดรคาร์บอนรวม
		โรงพยาบาลส่งเสริมสุขภาพตำบลโคกกรวด ตำบลโคกกรวด อำเภอเมืองนครราชสีมา จังหวัดนครราชสีมา
9-10 เมษายน 2569 T26AH969-0010	07:00-08:00 น.	1.92
	08:00-09:00 น.	1.75
	09:00-10:00 น.	1.58
	10:00-11:00 น.	1.50
	11:00-12:00 น.	1.54
	12:00-13:00 น.	1.69
	13:00-14:00 น.	1.83
	14:00-15:00 น.	1.89
	15:00-16:00 น.	1.93
	16:00-17:00 น.	1.91
	17:00-18:00 น.	1.90
	18:00-19:00 น.	1.85
	19:00-20:00 น.	1.82
	20:00-21:00 น.	1.80
	21:00-22:00 น.	1.81
	22:00-23:00 น.	1.88
	23:00-00:00 น.	1.96
	00:00-01:00 น.	2.00
	01:00-02:00 น.	2.01
	02:00-03:00 น.	1.94
	03:00-04:00 น.	1.93
	04:00-05:00 น.	1.94
	05:00-06:00 น.	1.99
	06:00-07:00 น.	1.89
	ค่าเฉลี่ย 24 ชั่วโมง	**1.84**

• ห้ามคัดถ่ายใบรายงานผลการวิเคราะห์แต่เพียงบางส่วน โดยไม่ได้รับอนุญาตจากห้องปฏิบัติการเป็นลายลักษณ์อักษร
• ใบรายงานผลนี้รับรองผลเฉพาะกับตัวอย่างที่นำมาทดสอบเท่านั้น

2026-U031116

- End of Analysis Report -

United Analyst and Engineering Consultant Co., Ltd.
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Tel.0 2763 2828 Fax 0 2763 2800 www.uaeconsultant.com E-mail: uae@uaeconsultant.com

ใบรายงานผลการวิเคราะห์

ชื่อโครงการ : การติดตามตรวจสอบผลกระทบสิ่งแวดล้อม และการตรวจสอบการปฏิบัติตามมาตรการป้องกันและแก้ไขผลกระทบสิ่งแวดล้อม โครงการก่อสร้างรถไฟความเร็วสูง ระยะที่ 1 สายกรุงเทพฯ-นครราชสีมา สัญญาที่ 3-4 ช่วงลำตะคอง-สีคิ้ว และช่วงกุดจิก-โคกกรวด
ชื่อลูกค้า : บริษัท อิตาเลียนไทย ดีเวล็อปเมนต์ จำกัด (มหาชน)
ที่อยู่ : 2034/132-161 อาคารอิตัลไทยทาวเวอร์ ถนนเพชรบุรีตัดใหม่ แขวงบางกะปิ เขตห้วยขวาง กรุงเทพมหานคร 10310
ข้อมูลผู้ติดต่อ : โทรศัพท์ : 08 8627 1864 อีเมล : environmentpublicrelations@gmail.com
สถานที่ตรวจวัด : โรงพยาบาลส่งเสริมสุขภาพตำบลคลองไผ่ ตำบลคลองไผ่ อำเภอสีคิ้ว จังหวัดนครราชสีมา
ประเภทการตรวจวัด : อากาศในบรรยากาศโดยทั่วไป
วันที่ตรวจวัด : 5-10 เมษายน 2569
เวลาที่ตรวจวัด : *
วิธีตรวจวัด : WIND SPEED & WIND DIRECTION EQUIPMENT
ผู้ตรวจวัด : นายศิรพัชร จงผดุงเกียรติ
วันที่รับตัวอย่าง : 5-10 เมษายน 2569
วันที่วิเคราะห์ : 5-10 เมษายน 2569
วันที่ออกรายงานผล : 21 เมษายน 2569
เลขที่ใบรายงานผล : 2026-U031117
เลขที่งาน : 2025-000443
หมายเลขปฏิบัติการ : T26AH969-0001 - T26AH969-0005

เวลา *	ผลการวิเคราะห์ (กิโลเมตร/ชั่วโมง) โรงพยาบาลส่งเสริมสุขภาพตำบลคลองไผ่ ตำบลคลองไผ่ อำเภอสีคิ้ว จังหวัดนครราชสีมา									
	5-6 เมษายน 2569 T26AH969-0001		6-7 เมษายน 2569 T26AH969-0002		7-8 เมษายน 2569 T26AH969-0003		8-9 เมษายน 2569 T26AH969-0004		9-10 เมษายน 2569 T26AH969-0005	
	ความเร็วลม	ทิศทางลม	ความเร็วลม	ทิศทางลม	ความเร็วลม	ทิศทางลม	ความเร็วลม	ทิศทางลม	ความเร็วลม	ทิศทางลม
07:00-08:00 น.	2.2	E	6.5	NE	9.7	S	10.8	SSW	3.2	NNW
08:00-09:00 น.	3.6	SE	7.2	NE	10.8	SW	11.5	SSE	5.0	W
09:00-10:00 น.	3.2	S	5.0	N	9.7	SW	9.7	S	7.2	WSW
10:00-11:00 น.	6.8	SSW	1.8	SW	10.8	SW	9.7	SW	7.9	WSW
11:00-12:00 น.	6.5	SSW	4.0	WSW	9.7	WSW	8.3	W	6.8	W
12:00-13:00 น.	6.5	SW	3.6	SW	8.6	WSW	7.9	W	7.9	WSW
13:00-14:00 น.	9.4	WSW	2.5	SSE	7.9	ENE	7.2	NW	7.2	WNW
14:00-15:00 น.	7.2	NNW	3.2	SE	11.9	NE	6.5	WSW	6.8	WNW
15:00-16:00 น.	6.5	W	3.6	E	11.9	NE	7.2	WNW	6.5	WNW
16:00-17:00 น.	5.8	N	2.2	NNE	7.6	NE	5.4	SW	6.5	WNW
17:00-18:00 น.	3.6	NW	4.0	ENE	7.2	NNE	6.5	SW	6.5	W
18:00-19:00 น.	3.2	N	3.6	NE	7.9	NNE	7.2	SSE	4.7	SW
19:00-20:00 น.	3.6	NW	3.6	SSW	7.2	NNE	7.6	ESE	5.0	SE
20:00-21:00 น.	2.2	NNW	4.0	SW	7.2	E	7.2	E	7.2	ESE
21:00-22:00 น.	3.6	NNW	4.0	W	6.5	SE	6.5	NE	6.5	SE
22:00-23:00 น.	3.2	N	3.6	WSW	6.8	SSE	7.2	NE	7.2	ESE
23:00-00:00 น.	5.0	N	4.7	NNW	7.9	W	7.2	ESE	7.9	SSE
00:00-01:00 น.	7.2	WSW	7.9	WSW	7.2	SSE	7.9	SSE	7.2	SE
01:00-02:00 น.	7.2	W	6.5	WNW	6.5	NW	4.7	SSW	7.9	SE
02:00-03:00 น.	9.0	WSW	9.4	SSW	8.3	NNW	3.6	NW	9.4	S
03:00-04:00 น.	11.9	SE	9.7	SSE	9.7	WSW	3.2	SW	10.8	SSW
04:00-05:00 น.	10.8	ESE	10.8	S	11.9	SW	4.0	WNW	11.9	S
05:00-06:00 น.	7.6	ESE	10.8	SSE	10.1	SSW	3.2	NNW	10.1	WSW
06:00-07:00 น.	7.2	ENE	10.8	SSW	11.9	SSE	3.2	W	11.9	WSW

(นายศิลา บรรจงโจรักษ์)
ผู้ควบคุมห้องปฏิบัติการ

• ห้ามคัดถ่ายใบรายงานผลการวิเคราะห์แต่เพียงบางส่วน โดยไม่ได้รับอนุญาตจากห้องปฏิบัติการเป็นลายลักษณ์อักษร
• ใบรายงานผลนี้รับรองผลเฉพาะกับตัวอย่างที่นำมาทดสอบเท่านั้น

- End of Analysis Report -

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Tel.0 2763 2828 Fax 0 2763 2800 www.uaeconsultant.com E-mail: uae@uaeconsultant.com

ใบรายงานผลการวิเคราะห์

ชื่อโครงการ : การติดตามตรวจสอบผลกระทบสิ่งแวดล้อม และการตรวจสอบการปฏิบัติตามมาตรการป้องกันและแก้ไขผลกระทบสิ่งแวดล้อม โครงการก่อสร้างรถไฟความเร็วสูง ระยะที่ 1 สายกรุงเทพฯ-นครราชสีมา สัญญาที่ 3-4 ช่วงลำตะคอง-สีคิ้ว และช่วงกุดจิก-โคกกรวด
ชื่อลูกค้า : บริษัท อิตาเลียนไทย ดีเวล็อปเมนต์ จำกัด (มหาชน)
ที่อยู่ : 2034/132-161 อาคารอิตัลไทยทาวเวอร์ ถนนเพชรบุรีตัดใหม่ แขวงบางกะปิ เขตห้วยขวาง กรุงเทพมหานคร 10310
ข้อมูลผู้ติดต่อ : โทรศัพท์ : 08 8627 1864 อีเมล : environmentpublicrelations@gmail.com
สถานที่ตรวจวัด : โรงพยาบาลส่งเสริมสุขภาพตำบลโคกกรวด ตำบลโคกกรวด อำเภอเมืองนครราชสีมา จังหวัดนครราชสีมา
ประเภทการตรวจวัด : อากาศในบรรยากาศโดยทั่วไป
วันที่ตรวจวัด : 5-10 เมษายน 2569
เวลาที่ตรวจวัด : *
วิธีตรวจวัด : WIND SPEED & WIND DIRECTION EQUIPMENT
ผู้ตรวจวัด : นายศิรพัชร จงผดุงเกียรติ
วันที่รับตัวอย่าง : 5-10 เมษายน 2569
วันที่วิเคราะห์ : 5-10 เมษายน 2569
วันที่ออกรายงานผล : 21 เมษายน 2569
เลขที่ใบรายงานผล : 2026-U031118
เลขที่งาน : 2025-000443
หมายเลขปฏิบัติการ : T26AH969-0006 - T26AH969-0010

เวลา *	ผลการวิเคราะห์ (กิโลเมตร/ชั่วโมง) โรงพยาบาลส่งเสริมสุขภาพตำบลโคกกรวด ตำบลโคกกรวด อำเภอเมืองนครราชสีมา จังหวัดนครราชสีมา									
	5-6 เมษายน 2569 T26AH969-0006		6-7 เมษายน 2569 T26AH969-0007		7-8 เมษายน 2569 T26AH969-0008		8-9 เมษายน 2569 T26AH969-0009		9-10 เมษายน 2569 T26AH969-0010	
	ความเร็วลม	ทิศทางลม	ความเร็วลม	ทิศทางลม	ความเร็วลม	ทิศทางลม	ความเร็วลม	ทิศทางลม	ความเร็วลม	ทิศทางลม
07:00-08:00 น.	6.8	S	3.2	S	7.2	SE	7.9	E	3.6	ESE
08:00-09:00 น.	7.9	SSW	4.0	S	7.2	ESE	4.7	ESE	7.6	ESE
09:00-10:00 น.	7.9	S	4.0	S	7.9	ESE	3.6	S	9.7	ESE
10:00-11:00 น.	5.0	SSW	5.0	NNE	7.9	E	3.2	SE	11.9	ESE
11:00-12:00 น.	7.2	WSW	7.2	NNE	6.5	ESE	3.6	SSE	10.1	ESE
12:00-13:00 น.	6.5	SSW	7.9	ESE	6.5	E	3.6	S	10.8	SE
13:00-14:00 น.	5.4	WNW	4.7	ESE	2.5	SW	4.0	SSE	9.7	SE
14:00-15:00 น.	3.6	WNW	4.0	SSW	3.6	SE	3.6	S	7.9	SSE
15:00-16:00 น.	4.0	WNW	3.2	WSW	3.2	SSW	3.2	SSW	11.9	S
16:00-17:00 น.	3.6	W	2.9	SW	6.8	SE	4.7	SW	9.7	W
17:00-18:00 น.	4.0	SW	4.0	S	9.7	ESE	7.9	SE	11.9	SSW
18:00-19:00 น.	4.0	SSW	4.0	SE	10.8	ENE	6.5	SSW	9.4	WSW
19:00-20:00 น.	3.2	SW	6.5	SE	11.2	N	6.1	ESE	10.8	NNE
20:00-21:00 น.	3.2	SW	6.5	E	10.8	NNE	6.5	ENE	10.8	ENE
21:00-22:00 น.	3.2	WSW	7.2	ESE	10.8	NNE	7.9	E	9.7	NE
22:00-23:00 น.	4.0	SSW	6.5	NE	8.3	NE	5.8	N	8.3	E
23:00-00:00 น.	3.6	SSW	7.9	N	3.2	NE	6.5	N	9.7	ESE
00:00-01:00 น.	3.6	SW	7.9	NNE	7.2	NE	7.9	NE	9.7	E
01:00-02:00 น.	3.2	WSW	6.5	NE	3.2	NE	4.7	NE	9.7	ESE
02:00-03:00 น.	1.8	SW	6.8	E	2.9	ENE	3.6	ENE	7.9	SSW
03:00-04:00 น.	4.0	SW	6.5	ESE	4.0	ENE	4.0	E	11.9	SSW
04:00-05:00 น.	3.2	SSW	7.9	SE	3.2	ENE	3.6	ENE	11.9	S
05:00-06:00 น.	2.9	SW	9.4	S	4.3	ENE	2.2	E	7.6	S
06:00-07:00 น.	3.2	SSW	6.5	ESE	7.9	E	7.2	E	9.7	ESE

(นายศิลา บรรจงโจรักษ์)
ผู้ควบคุมห้องปฏิบัติการ

• ห้ามคัดถ่ายใบรายงานผลการวิเคราะห์แต่เพียงบางส่วน โดยไม่ได้รับอนุญาตจากห้องปฏิบัติการเป็นลายลักษณ์อักษร
• ใบรายงานผลนี้รับรองผลเฉพาะกับตัวอย่างที่นำมาทดสอบเท่านั้น

- End of Analysis Report -

เอกสารแนบ 4-2

เอกสารสอบเทียบเครื่องมือตรวจวัดเสียง

THAILAND INSTITUTE OF SCIENTIFIC AND TECHNOLOGICAL RESEARCH (TISTR)

Request No. 21-69/0204 **MTC No.** EEL. BP. 152/0169

CALIBRATION CERTIFICATE

Submitted by : S.P.S.CONSULTING SERVICE CO.,LTD.
Address : 7 Soi Phaholyothin 24, Phaholyothin Road, Jompol, Chatuchak, Bangkok 10900.
Calibrated at : Electrical and Electronic Standards Laboratory, Industrial Metrology and Testing Service Centre.
Soi 1C, Bangpoo Industrial Estate, Sukhumvit Rd., Muang, Samutprakan 10280.

Instrument Calibrated :
Description : Sound Calibrator
Manufacturer : ACO
Model : 2127
Serial No. : 130006

Ambient Environment
Temperature : (23 ± 3) °C
Relative Humidity : (50 ± 15) %
Ambient Pressure : (101.325 ± 1.500) kPa

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

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

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

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

Date of Receipt : 29 Jan. 2026
Date of Calibration : 11 Feb. 2026

1 / 2

The results relate only to the items tested/calibrated or value assigned.
Advertising the Report/Certificate and publicity of the results except in full are prohibited unless written permission is obtained from the governor of TISTR.

FM.BL.MTC.002 Rev.5

Head Office
35 Mu 3 Tambon Khlong Ha, Amphoe Khlong Luang, Changwat Pathumthani 12120, Thailand
Tel. (66) 0 2577 9036
Fax. (66) 0 2577 9009

Office/Laboratory
668 Mu 2 Tambon Bangpoomai, Amphoe Muang Samutprakan, Changwat Samutprakan 10280, Thailand
Tel. (66) 0 2323 1672-80 ext. 115, 116
(66) 08 3219 9440
E-mail : mtc@tistr.or.th Website : www.tistr.or.th

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

THAILAND INSTITUTE OF SCIENTIFIC AND TECHNOLOGICAL RESEARCH (TISTR)

Request No. 21-69/0204 **MTC No.** EEL. BP. 152/0169

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

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

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

1. Sound Pressure Level

Standard Microphone Type	Measured Sound Pressure Level (dB)	Deviated value (dB)	Uncertainty (dB)	Tolerance limit IEC60942:2003 Class 1
1/2 inch Bruel&Kjaer 4180	93.89	-0.11	± 0.10	±0.40 dB

2. Frequency

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

3. Total Distortion

Standard Microphone Type	Measured Total Distortion (%)	Uncertainty (%)	Tolerance limit IEC60942:2003 Class 1
1/2 inch Bruel&Kjaer 4180	1.90	± 0.50	±3.0%

Note : 1. No adjustment.
2. The calibrator pressure correction was not included.
3. The microphone volume correction was not included.

Calibrated by : (Mr.Weerachai Deechaiyae)

Approved by : Mr.Prawalit Khuypa, Director, Electrical and Electronic Standards Laboratory, Industrial Metrology and Testing Service Centre

Date of Calibration : 11 Feb. 2026
Date of Issue : 12 Feb. 2026
Ref : 2011269012900497001

End of Certificate

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The results relate only to the items tested/calibrated or value assigned.
Advertising the Report/Certificate and publicity of the results except in full are prohibited unless written permission is obtained from the governor of TISTR.

FM.BL.MTC.002 Rev.5

Head Office
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(66) 08 3219 9440
E-mail : mtc@tistr.or.th Website : www.tistr.or.th

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

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

Noise B_112/26

Sound Level Meter Calibration Report

Acoustic Calibrator Data

Brand	ACO	Number	AC 03/56
Model	2127	Serial No.	130006
Calibration Range	94 dB, 1000 Hz	Last Calibration	11 February 2026
		Due Date	11 February 2027

Calibration Data

Sound Level Meter Data				Calibration Data		
SLM No.	Brand	Model	Serial No.	Date	Actual Reading [dB] Before Adjustment	After Adjustment
ACO-B24	ACO	6236	00182005	10 March 2026	93.9	93.9
ACO-B39	ACO	6236	00222301	10 March 2026	93.9	93.9
Acoustic Certified Value : Thailand Institute of Scientific and Technological Research (TISTR)					93.89 ± 0.10 dB	

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

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

Noise B_110/26

Sound Level Meter Calibration Report

Acoustic Calibrator Data

Brand	ACO	Number	AC 03/56
Model	2127	Serial No.	130006
Calibration Range	94 dB, 1000 Hz	Last Calibration	11 February 2026
		Due Date	11 February 2027

Calibration Data

Sound Level Meter Data				Calibration Data		
SLM No.	Brand	Model	Serial No.	Date	Actual Reading [dB] Before Adjustment	After Adjustment
ACO-B39	ACO	6236	00222301	05 March 2026	93.9	93.9
Acoustic Certified Value : Thailand Institute of Scientific and Technological Research (TISTR)					93.89 ± 0.10 dB	

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

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

Noise B_112/26

Sound Level Meter Calibration Report

Acoustic Calibrator Data			
Brand	ACO	Number	AC 03/56
Model	2127	Serial No.	130006
Calibration Range	94 dB, 1000 Hz	Last Calibration	11 February 2026
		Due Date	11 February 2027

Calibration Data

Sound Level Meter Data				Calibration Data		
SLM No.	Brand	Model	Serial No.	Date	Actual Reading [dB]	
					Before Adjustment	After Adjustment
ACO-B24	ACO	6236	00182005	10 March 2026	93.9	93.9
ACO-B39	ACO	6236	00222301	10 March 2026	93.9	93.9
Acoustic Certified Value : Thailand Institute of Scientific and Technological Research (TISTR)					93.89 ± 0.10 dB	

Calibrated by : Adul Dangklom
(Mr. Adul Dangklom)

Approved by :
(Mr. Peera Detudom)

List of Instruments Certification for Noise Quality Analysis

No.	Instrument/Equipment	Parameter	Manufacturer	Model/Serial No.	Calibrator	Certification No.	Date of Calibration	Due date of Calibration	Remark
Ambient									
1	Sound Level Calibrator (Acoustic Calibrator)	Calibrate Sound Level Meter	Larson Davis	CAL150 6855	Innovative Instrument Co.,Ltd.	25-ACT-137	9 Sep 25	8 Sep 26	-
2	Sound Level Meter	$L_{Aeq\ 24\ hr}$, $L_{Aeq\ 1\ hr}$, L_{Amax}, $L_{A90\ 5\ min}$	Larson Davis	LxT2 0005398	Innovative Instrument Co.,Ltd.	25-SLM-247	30 Jul 25	29 Jul 27	-
3	Sound Level Meter	$L_{Aeq\ 24\ hr}$, $L_{Aeq\ 1\ hr}$, L_{Amax}, $L_{A90\ 5\ min}$	Larson Davis	LxT2 0006696	Innovative Instrument Co.,Ltd.	25-SLM-243	29 Jul 25	28 Jul 27	-

CALIBRATION LABORATORY CO., LTD.
2/10-11,14,55 Soi Prasert Manukit 29 Yaek 4, Prasert Manukit Rd., Ladphrao, Bangkok 10230
Tel. 02-578-0353-4 Fax: 02-578-2672 www.cal-laboratory.com E-mail:sale@cal-laboratory.com

CERTIFICATE OF CALIBRATION

FOR

NOMENCLATURE	:	VIBRATION METER
MANUFACTURER	:	INSTANTEL
MODEL / TYPE	:	721A2501/721A2901
SERIAL NO.	:	UM12888/UM12888 [UAE.EFM.004/2561]
CLID. NO.	:	251900037
JOB CONTROL NO.	:	250617070063
CALIBRATION SERVICE	:	☑ IN-LABORATORY ☐ ON-SITE

CUSTOMER : UNITED ANALYST AND ENGINEERING CONSULTANT CO., LTD.
81 SOI UDOMSUK 41, SUKHUMVIT ROAD,
BANGCHAK, PHRAKHANONG, BANGKOK 10260

DATE OF RECEIVED : 17 June 2025 DATE OF ISSUED : 20 June 2025

The report of calibration shall not be reproduced except in full without approval of the Calibration Laboratory Co., Ltd.

Calibrated By : Suwit Phuanbusabong
Calibration Engineer

Approved By : Mongkol Yotsoontorn
Authorized Signatory
20 June 2025

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

เอกสารไม่ควบคุม

CALIBRATION LABORATORY CO., LTD.
2/10-11,14,55 Soi Prasert Manukit 29 Yaek 4, Prasert Manukit Rd., Ladphrao, Bangkok 10230
Tel. 02-578-0353-4 Fax: 02-578-2672 www.cal-laboratory.com E-mail:sale@cal-laboratory.com

REPORT OF CALIBRATION

FOR

NOMENCLATURE	:	VIBRATION METER
MANUFACTURER	:	INSTANTEL
MODEL / TYPE	:	721A2501/721A2901
SERIAL NO.	:	UM12888/UM12888 [UAE.EFM.004/2561]
DATE OF CALIBRATION	:	18 June 2025

ENVIRONMENT CONDITIONS :
Temperature : (23 ± 2) °C Relative Humidity : (55 ± 15) %RH

PROCEDURE USED :
This instrument was calibrated under procedure No. **CLC-CPEE-08** based on **ISO 16063-21** as calibration guideline.
The calibration was performed by using Digital Multimeter, Universal Counter,
Accelerometer and Measuring Amplifier which maintained by the Calibration Laboratory Co., Ltd.

REFERENCE STANDARD USED :
1. Universal Counter, Hewlett Packard Model 5315A S/N. 2448A13042.
2. Digital Multimeter, Keysight Technologies Model 3458A S/N. MY59352733.
3. Accelerometer with Measuring Amplifier, Bruel & Kjaer Model 8305, 2525 S/N. 397018, 2434988.

TRACEABILITY :
1. The measurements are traceable to International System of Units (SI), through Aeronautical Radio of Thailand Ltd. Certificate No. 07-0006/25, Due Date 20 January 2026.
2. The measurements are traceable to International System of Units (SI), through National Institute of Metrology (Thailand) Certificate No. EE-0060-24, Due Date 26 June 2025.
3. The measurements are traceable to International System of Units (SI), through National Institute of Metrology (Thailand) Certificate No. AV-0056-24, Due Date 14 December 2025.

UNCERTAINTY :
The reported expanded uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor $k = 2{,}00$ which for a normal distribution corresponds to a coverage probability of approximately 95 %.
It has been evaluated according to the "Evaluation of the Uncertainty of Measurement in Calibration (EA-4/02 M:2022)"

เอกสารไม่ควบคุม

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Tel. 02-578-0353-4 Fax: 02-578-2672 www.cal-laboratory.com E-mail:sale@cal-laboratory.com

CONDITION OF CALIBRATION ITEM : RECEIVED IN GOOD OPERATIONAL CONDITION
MEASUREMENT RESULTS : (X) without adjustment ( ) adjustment

CALIBRATION DATA

1. ACCELERATION RESULT

Test point (g)	Test point (frequency)	Mode	STD Reading (g)	DUC Reading (g)	Correction (g)	Uncertainty ± (% of rdg.)
0.3	50 Hz	peak	0.300	0.301	-0.001	1.9
0.4	50 Hz		0.400	0.401	-0.001	1.3
0.5	50 Hz		0.500	0.502	-0.002	1.3
0.6	50 Hz		0.600	0.605	-0.005	2.5
0.7	50 Hz		0.700	0.706	-0.006	2.5
0.3	100 Hz	peak	0.300	0.300	0.000	1.9
0.4	100 Hz		0.400	0.402	-0.002	1.3
0.5	100 Hz		0.500	0.504	-0.004	1.3
0.6	100 Hz		0.600	0.606	-0.006	2.5
0.7	100 Hz		0.700	0.708	-0.008	2.5

2. VELOCITY RESULT

Test point (mm/s)	Test point (frequency)	Mode	STD Reading (mm/s)	DUC Reading (mm/s)	Correction (mm/s)	Uncertainty ± (% of rdg.)
3	50 Hz	peak	3.000	2.990	+0.010	1.8
4	50 Hz		4.000	3.969	+0.031	1.8
5	50 Hz		5.000	4.948	+0.052	1.8
6	50 Hz		6.000	5.927	+0.073	1.8
7	50 Hz		7.000	6.906	+0.094	1.8
3	100 Hz	peak	3.000	2.988	+0.012	2.7
4	100 Hz		4.000	3.978	+0.022	1.3
5	100 Hz		5.000	4.967	+0.033	1.3
6	100 Hz		6.000	5.957	+0.043	1.0
7	100 Hz		7.000	6.946	+0.054	1.0

เอกสารไม่ควบคุม

CALIBRATION LABORATORY CO., LTD.
2/10-11,14,55 Soi Prasert Manukit 29 Yaek 4, Prasert Manukit Rd., Ladphrao, Bangkok 10230
Tel. 02-578-0353-4 Fax: 02-578-2672 www.cal-laboratory.com E-mail:sale@cal-laboratory.com

CALIBRATION DATA

3. DISPLACEMENT RESULT

Test point (mm)	Test point (frequency)	Mode	STD Reading (mm)	DUC Reading (mm)	Correction (mm)	Uncertainty ± (% of rdg.)
0.03	50 Hz	peak	0.030	0.030	0.000	2.1
0.04	50 Hz		0.040	0.040	0.000	1.7
0.05	50 Hz		0.050	0.050	0.000	1.4
0.06	50 Hz		0.060	0.060	0.000	1.3
0.07	50 Hz		0.070	0.069	+0.001	1.1
0.03	100 Hz	peak	0.030	0.030	0.000	2.1
0.04	100 Hz		0.040	0.040	0.000	1.7
0.05	100 Hz		0.050	0.050	0.000	1.4
0.06	100 Hz		0.060	0.059	+0.001	1.3
0.07	100 Hz		0.070	0.071	-0.001	1.1

Note. The Scope of Accredited ANAB Certificate No. ACDM-2814 Version 015 Page 1,2 of 68

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

End of Certificate

เอกสารไม่ควบคุม

CALIBRATION LABORATORY CO., LTD.
2/10-11,14,55 Soi Prasert Manukit 29 Yaek 4, Prasert Manukit Rd., Ladphrao, Bangkok 10230
Tel. 02-578-0353-4 Fax: 02-578-2672 www.cal-laboratory.com E-mail:sale@cal-laboratory.com

CERTIFICATE OF CALIBRATION

FOR

NOMENCLATURE	:	VIBRATION METER
MANUFACTURER	:	INSTANTEL
MODEL / TYPE	:	721A2501/721A2901
SERIAL NO.	:	UM13205/UM13205 [UAE.EFM.051/2561]
CLID. NO.	:	251900275
JOB CONTROL NO.	:	250730088632
CALIBRATION SERVICE	:	☑ IN-LABORATORY ☐ ON-SITE

CUSTOMER : UNITED ANALYST AND ENGINEERING CONSULTANT CO., LTD.
81 SOI UDOMSUK 41, SUKHUMVIT ROAD,
BANGCHAK, PHRAKHANONG, BANGKOK 10260

DATE OF RECEIVED : 30 July 2025 DATE OF ISSUED : 05 August 2025

The report of calibration shall not be reproduced except in full without approval of the Calibration Laboratory Co., Ltd.

Calibrated By : Suwit Phuanbusabong
Calibration Engineer

Approved By : Mongkol Yotsoontorn
Authorized Signatory
05 August 2025

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

Certificate No. Q25088632
F3-011-05/12-23

เอกสารไม่ควบคุม
@clccalibration

CALIBRATION LABORATORY CO., LTD.
2/10-11,14,55 Soi Prasert Manukit 29 Yaek 4, Prasert Manukit Rd., Ladphrao, Bangkok 10230
Tel. 02-578-0353-4 Fax: 02-578-2672 www.cal-laboratory.com E-mail:sale@cal-laboratory.com

REPORT OF CALIBRATION

FOR

NOMENCLATURE	:	VIBRATION METER
MANUFACTURER	:	INSTANTEL
MODEL / TYPE	:	721A2501/721A2901
SERIAL NO.	:	UM13205/UM13205 [UAE.EFM.051/2561]
DATE OF CALIBRATION	:	01 August 2025

ENVIRONMENT CONDITIONS :
Temperature : (23 ± 2) °C Relative Humidity : (55 ± 15) %RH

PROCEDURE USED :
This instrument was calibrated under procedure No. **CLC-CPEE-08** based on **ISO 16063-21** as calibration guideline.
The calibration was performed by using Advanced Multimeter, Programmable Timer/Counter and Accelerometer with Measuring Amplifier which maintained by the Calibration Laboratory Co., Ltd.

REFERENCE STANDARD USED :
1. Advanced Multimeter, Transmile Model 8104 S/N. N2164D24.
2. Programmable Timer/Counter, Philips Model PM6680B S/N. SM607101.
3. Accelerometer with Measuring Amplifier, Bruel & Kjaer Model 8305, 2625 S/N. 397018, 2434988.

TRACEABILITY :
1. The measurements are traceable to International System of Units (SI) , through Transmille Ltd.
Certificate No. 54742, Due Date 02 July 2026.
2. The measurements are traceable to International System of Units (SI), through Aeronautical Radio of Thailand Ltd.
Certificate No. 07-0054/25 , Due Date 11 June 2026.
3. The measurements are traceable to International System of Units (SI), through National Institute of Metrology (Thailand)
Certificate No. AV-0056-24, Due Date 14 December 2025.

UNCERTAINTY :
The reported expanded uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor $k = 2{,}00$ which for a normal distribution corresponds to a coverage probability of approximately 95 %.
It has been evaluated according to the "Evaluation of the Uncertainty of Measurement in Calibration (EA-4/02 M:2022)"

Certificate No. Q25088632
F3-011-05/12-23

เอกสารไม่ควบคุม
@clccalibration

CALIBRATION LABORATORY CO., LTD.
2/10-11,14,55 Soi Prasert Manukit 29 Yaek 4, Prasert Manukit Rd., Ladphrao, Bangkok 10230
Tel. 02-578-0353-4 Fax: 02-578-2672 www.cal-laboratory.com E-mail:sale@cal-laboratory.com

CONDITION OF CALIBRATION ITEM : RECEIVED IN GOOD OPERATIONAL CONDITION

MEASUREMENT RESULTS : (X) without adjustment ( ) adjustment

CALIBRATION DATA

1. ACCELERATION RESULT

Test point		Mode	STD Reading	DUC Reading	Correction	Uncertainty
(g)	(frequency)		(g)	(g)	(g)	± (% of rdg.)
0.3	50 Hz	peak	0.300	0.304	-0.004	1.9
0.4	50 Hz		0.400	0.406	-0.006	1.6
0.5	50 Hz		0.500	0.508	-0.008	1.6
0.6	50 Hz		0.600	0.609	-0.009	2.5
0.7	50 Hz		0.700	0.711	-0.011	2.5
0.3	100 Hz	peak	0.300	0.302	-0.002	1.9
0.4	100 Hz		0.400	0.404	-0.004	1.6
0.5	100 Hz		0.500	0.505	-0.005	1.6
0.6	100 Hz		0.600	0.607	-0.007	2.5
0.7	100 Hz		0.700	0.710	-0.010	2.5

2. VELOCITY RESULT

Test point		Mode	STD Reading	DUC Reading	Correction	Uncertainty
(mm/s)	(frequency)		(mm/s)	(mm/s)	(mm/s)	± (% of rdg.)
3	50 Hz	peak	3.000	3.033	-0.033	1.8
4	50 Hz		4.000	4.044	-0.044	1.8
5	50 Hz		5.000	5.052	-0.052	1.8
6	50 Hz		6.000	6.061	-0.061	1.8
7	50 Hz		7.000	7.072	-0.072	1.8
3	100 Hz	peak	3.000	3.033	-0.033	1.6
4	100 Hz		4.000	4.046	-0.046	1.6
5	100 Hz		5.000	5.053	-0.053	1.6
6	100 Hz		6.000	6.062	-0.062	1.5
7	100 Hz		7.000	7.079	-0.079	1.5

Certificate No. Q25088632
F3-011-05/12-23

เอกสารไม่ควบคุม
@clccalibration

CALIBRATION LABORATORY CO., LTD.
2/10-11,14,55 Soi Prasert Manukit 29 Yaek 4, Prasert Manukit Rd., Ladphrao, Bangkok 10230
Tel. 02-578-0353-4 Fax: 02-578-2672 www.cal-laboratory.com E-mail:sale@cal-laboratory.com

CALIBRATION DATA

3. DISPLACEMENT RESULT

Test point		Mode	STD Reading	DUC Reading	Correction	Uncertainty
(mm)	(frequency)		(mm)	(mm)	(mm)	± (% of rdg.)
0.03	50 Hz	peak	0.030	0.030	0.000	2.5
0.04	50 Hz		0.040	0.040	0.000	2.1
0.05	50 Hz		0.050	0.050	0.000	1.9
0.06	50 Hz		0.060	0.061	-0.001	1.8
0.07	50 Hz		0.070	0.071	-0.001	1.8
0.03	100 Hz	peak	0.030	0.030	0.000	2.5
0.04	100 Hz		0.040	0.040	0.000	2.1
0.05	100 Hz		0.050	0.050	0.000	1.9
0.06	100 Hz		0.060	0.061	-0.001	1.8
0.07	100 Hz		0.070	0.071	-0.001	1.8

Note. The Scope of Accredited ANAB Certificate No. ACDM-2814 Version 015 Page 1,2 of 68

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

End of Certificate

Certificate No. Q25088632
F3-011-05/12-23

เอกสารไม่ควบคุม
@clccalibration

INNOVATIVE INSTRUMENT CALIBRATION LAB
INNOVATIVE INSTRUMENT CO., LTD. HEAD OFFICE
7 139 MOO 13, SOI SUNTINAKORN 11 TAMBON BANG KAEO,
AMPHOE BANG PHLI SAMUT PRAKAN PROVINCE 10540 THAILAND
TEL: 06600-2116-5860-1 FAX: 06600-2116-7140

Certificate of Calibration

Customer

Name : UNITED ANALYST AND ENGINEERING CONSULTANT CO.,LTD.

Address : 81 Soi Udomsuk 41, Sukhumvit Road, Bangchak, Prakanong, Bangkok 10260

Certificate No : 25-ACT-137

Request No : Req-2025-1828

Unit Under Calibration Details

Measurement item : Acoustic Calibrator

Manufacturer : LARSON DAVIS

Model : CAL150

Serial Number : 6855

ID : UAE.EFM.046/2566

Class : 2

Range : 94 , 114 dB 1000 Hz

Instrument Status : Used

Calibration Environment and Details

Temperature : (23 ±2 °C)

Humidity : (50 ± 20 %RH)

Barometric Pressure : (1013 ±10.0 hPa)

Received Date : 7 August 2025

Calibration Date : 9 September 2025

Location of Calibration : LAB 1 Acoustic

Calibration Procedure : In-house method CP-ACT-02 based on IEC 60942:2017 Electroacoustics - Sound calibrators

Reference Standard	Model	Serial Number	Traceable	Due Calibration
Sound Calibrator	SV 35A	58079	EEI	20 June 2026
THD Multimeter	2015	1047765	NIMT	4 February 2026

Traceability : This certificate providoes traceability of measurement to recognized national standard, and to the realization of the international System of Units (SI).

Note

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

Calibrated By : Mr. Noppadon Luangart
Service Calibration Engineer

Approved By : Mr. Pacit Mathavorn
Calibration Engineer Supervisor

Issue Date : 9 September 2025

เอกสารไม่ควบคุม
The results related only to the item calibrated. The certificate shall not be reproduced except in full, without written approval of the Innovative Instrument Co.,Ltd.

INNOVATIVE INSTRUMENT CALIBRATION LAB
INNOVATIVE INSTRUMENT CO., LTD. HEAD OFFICE
7 139 MOO 13, SOI SUNTINAKORN 11 TAMBON BANG KAEO,
AMPHOE BANG PHLI SAMUT PRAKAN PROVINCE 10540 THAILAND
TEL: 06600-2116-5860-1 FAX: 06600-2116-7140

Certificate No : 25-ACT-137

Request No : Req-2025-1828

Sound pressure level — **Calibration Results :** Without Adjustment

Calibration Range (dB)	Without Adjustment (dB)		Adjustment (dB)		Uncertainty (± dB)
	Measured	Deviated value	Measured	Deviated value	
94 dB / 1000 Hz	93.81	-0.19	-	-	0.11
114 dB / 1000 Hz	113.94	-0.06	-	-	0.11

Frequency of Sound pressure level

Calibration Range (Hz)	Without Adjustment		Adjustment		Uncertainty (± %)
	Measured (Hz)	Deviated value	Measured (Hz)	Deviated value	
94 dB / 1000 Hz	1000.00	0.00	-	-	0.01
114 dB / 1000 Hz	1000.00	0.00	-	-	0.01

Total Harmonic Distortion plus Noise of Sound pressure level (THD+N %)

Calibration Range (Hz)	Without Adjustment	Adjustment	Uncertainty (± %)
	Measured (%)	Measured (%)	
94 dB / 1000 Hz	1.18	-	0.17
114 dB / 1000 Hz	0.63	-	0.17

Note :

- The calibration results exclude the calibrator pressure correction
- The calibration results exclude the microphone volume correction

End of Calibration

เอกสารไม่ควบคุม
The results related only to the item calibrated. The certificate shall not be reproduced except in full, without written approval of the Innovative Instrument Co.,Ltd.
FM-708-ACT-02 Rev.04 Issue date 17/2/25

เอกสารแนบ 4-3

เอกสารสอบเทียบเครื่องมือตรวจวิเคราะห์คุณภาพน้ำผิวดิน

CAL
Calibratech Co.,Ltd.
7/106-7 Moo 2, Sukhaprachasan 3 Rd., Bangpood, Pakkred, Nonthaburi 11120
Tel.(02) 964-6211 Fax.(02) 964-5155, e-mail : calibratech..cal@yahoo.com, calibratech..cal@hotmail.com

NSC-TISI-TIS 17025
CALIBRATION 0030

Certificate of Calibration

Certificate No. : 69-400023-2 **Page : 1 of 2**

Submitted by : S. P. S Consulting Service Co., Ltd.
7 Soi Phaholyothin 24, Phaholyothin Rd., Jompol, Chatuchak, Bangkok 10900

Equipment : Liquid in Glass Thermometer

Manufacturer :	SK	Model :	N/A
Range :	0 °C to 100 °C	Resolution :	1 °C
Serial No. :	N/A	Immersion :	Total
ID No. :	TM21/59		

Environment :

Ambient Temperature :	(23 ± 2) °C
Relative Humidity :	(50 ± 15) %
Line Voltage :	(220 ± 22) VAC

Date of Received : 13 January 2026
Date of Calibration : 16 January 2026
Date of Issue : 16 January 2026
Calibrated by : Chortip Samchusri

Calibration Method : This instrument was calibrated by In-house method comparison technique CAL-M4001 based on ASTM E77-07 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
400001	TT-0023-24	16 Feb 2026	National Institute of Metrology Thailand (NIMT)

2. Standard Digital Thermometer

ID No.	Cert. No.	Due Date	Traceability
400003	25E1656	22 May 2027	National Institute of Metrology Thailand (NIMT)
400004	25E1656	22 May 2027	National Institute of Metrology Thailand (NIMT)

Approved by :
(Permpon Chanpu)
Supervisor

The Uncertainties are for a confidence probability of approximately 95%

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CAL
Calibratech Co.,Ltd.
7/106-7 Moo 2, Sukhaprachasan 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. : 69-400023-2 **Page : 2 of 2**

Result of Calibration : Without Adjustment
UUC Condition As-Received : Good
Function : Temperature measurement
Ice point check : UUC* reading 0 °C Standard reading 0.4773 °C

Standard Reading (°C)	UUC Reading (°C)	Correction (°C)	Uncertainty (±°C)
20.3922	20	0.4	0.31

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%

- o0o -

CALIBRATION LABORATORY CO., LTD.
2/10-11,14,55 Soi Prasert Manukit 29 Yaek 4, Prasert Manukit Road, Ladphrao, Bangkok 10230
Tel. 02-578-0353-4 Fax. 02-578-2672 www.cal-laboratory.com E-mail: sale@cal-laboratory.com

CLC Accredited ISO/IEC 17025

NSC-TISI-TIS 17025
CALIBRATION 0059
CLC

CERTIFICATE OF CALIBRATION

FOR

NOMENCLATURE	:	CONDUCTIVITY METER
MANUFACTURER	:	METTLER TOLEDO
MODEL / TYPE	:	SEVEN COMPACT S230
SERIAL NO.	:	C141708983/5821320179[CD 05/65]
CLID. NO.	:	272300452
JOB CONTROL NO.	:	260202014122
CALIBRATION SERVICE	:	☑ IN-LABORATORY ☐ ON-SITE

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

DATE OF RECEIVED : 02 February 2026 **DATE OF ISSUED :** 04 February 2026

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

Calibrated By : Sukgasem Seehanart
Wenick Inchaisri
Calibration Engineer

Approved By : Mongkol Yotsoontorn
Authorized Signatory
04 February 2026

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

@clccalibration

CALIBRATION LABORATORY CO., LTD.
2/10-11,14,55 Soi Prasert Manukit 29 Yaek 4, Prasert Manukit Road, Ladphrao, Bangkok 10230
Tel. 02-578-0353-4 Fax. 02-578-2672 www.cal-laboratory.com E-mail: sale@cal-laboratory.com

CLC Accredited ISO/IEC 17025

NSC-TISI-TIS 17025
CALIBRATION 0059
CLC

REPORT OF CALIBRATION

FOR

NOMENCLATURE	:	CONDUCTIVITY METER
MANUFACTURER	:	METTLER TOLEDO
MODEL / TYPE	:	SEVEN COMPACT S230
SERIAL NO.	:	C141708983/5821320179[CD 05/65]
DATE OF CALIBRATION	:	03 February 2026

ENVIRONMENT CONDITIONS :
Temperature : (25 ± 2.5) °C **Relative Humidity :** (50 ± 15) % RH

PROCEDURE USED :
This instrument [Conductivity Meter] was calibrated under procedure No. **WI-305-130.**
The calibration was performed by direct measurement with Certified Reference Material (CRM) and Reference Material (RM) .
This instrument [Temperature] was calibrated by comparison with Temperature Bath, Precision Thermometer and IPRT which maintained by the Calibration Laboratory Co., Ltd.

REFERENCE STANDARD USED :
1. Conductivity Standard , Hanna Product Code HI7033L Lot Number 0101.
2. Potassium Chloride Solution, Sigma-Aldrich Canada Co Product No. 1.01203.0500.
3. Potassium Chloride Solution, Sigma-Aldrich Canada Co Product No. 1.01254.0500.
4. Temperature Bath, Jingmi Model RTS-35S S/N. 16339.
5. Precision Thermometer, ASL Model F200-A-8 S/N. 014433/03.
6. IPRT, ASL Model T100-250-1D S/N. PO106346-1-13.

@clccalibration

TRACEABILITY :

1. The measurements are traceable to International System of Units (SI) , through Hanna instruments.
Certificate No. 07D45, Due Date April 2027.
2. The measurements are traceable to International System of Units (SI) , through Sigma-Aldrich Canada Co.
Lot Number. HC56384703, Due Date 31 January 2028.
3. The measurements are traceable to International System of Units (SI) , through Sigma-Aldrich Canada Co.
Lot Number. HC33528554, Due Date 30 November 2026.
4. The measurements are traceable to International System of Units (SI) , through Calibration Laboratory Co., Ltd.
Certificate No. Q25097314, Due Date 29 August 2026.
5. The measurements are traceable to International System of Units (SI) , through Thailand Institute of Scientific and Technological Research (TISTR). Certificate No. PSL-T 0177/68, Due Date 10 February 2026.
6. The measurements are traceable to International System of Units (SI) , through National Institute of Metrology (Thailand).
Certificate No. TT-1008-25, Due Date 04 March 2026.

UNCERTAINTY :

The reported expanded uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor complies with the table which for a normal distribution corresponds to a coverage probability of approximately 95 %.
It has been evaluated according to the "Evaluation of the Uncertainty of Measurement in Calibration (EA-4/02 M:2022)"

CALIBRATION LABORATORY CO., LTD.
2/10-11,14,55 Soi Prasert Manukit 29 Yaek 4, Prasert Manukit Road, Ladphrao, Bangkok 10230
Tel. 02-578-0353-4 Fax. 02-578-2672 www.cal-laboratory.com E-mail: sale@cal-laboratory.com
CLC Accredited ISO/IEC 17025
NSC-TISI-TIS 17025 CALIBRATION 0859 CLC

CONDITION OF CALIBRATION ITEM : RECEIVED IN GOOD OPERATIONAL CONDITION

MEASUREMENT RESULTS : (X) without adjustment ( ) adjustment

The table in the following gives the calibration results and associated measurement uncertainties of Conductivity Meter.

CALIBRATION DATA

1. Conductivity Solution Test @ 25°C

Standard Conductivity Solution	DUC Reading	Uncertainty of Measurement	*k* Factor
*84 µS/cm	83.95 µS/cm [Cell Constant 0.470]	± 1.15 µS/cm	2,00
1414 µS/cm	1414 µS/cm [Cell Constant 0.510]	± 21 µS/cm	2,00
12.83 mS/cm	12.83 mS/cm [Cell Constant 0.570]	± 0.19 mS/cm	2,00

Note. The Scope of Accredited TISI Certificate No. 23-LB0092 Issue 02 Page 91 of 138

* means Calibrations marked "Not TISI Accredited" in this Certificate have been included for completeness.

***2. TEMPERATURE RESULT**

Immersion depth (mm)	Actual Temperature (°C)	DUC Reading (°C)	Correction (°C)	Uncertainty ±(°C)
100	25.00	25.1	-0.10	0.08

Technical Note. Type of sensor : Conductivity Probe
Probe Ø 12 mm
The reported uncertainty is based on a standard uncertainty multiplied by coverage factor of $k = 2$.
Note. * means Calibrations marked "Not TISI Accredited" in this Certificate have been included for completeness.

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

End of Certificate

HARIKUL SCIENCE

Harikul Science Co.,Ltd.
694 Soi Ratchadanivet 24, Pracharatbamphen, Samsaennok, Huaikhwang, Bangkok 10310
Tel: 0-2274-2456 Fax: 0-2274-2443
Email:info@harikul.com www.harikul.com

CERT.No.: HS-W015C — Certificate of Calibration

Calibration Date :	18 Mar 25	Model	: YSI 5000
Submitted by :	S.P.S CONSULTING SERVICE CO.,LTD	S/N	: 15B100751
	7 Soi Phaholyothin 24, Phaholyothin Rd., Jompol,	Probe	: YSI 5010
	Chatuchak, Bangkok, Thailand 10900	S/N	: 22D100097
		ID NO.	: -
Avg Room Temp :	20 °C	Air Temp ref	: S/N. F8065C26
Avg Water Temp :	20 °C	Barometric ref	: S/N. F8065C26
Air Pressure :	760.00 mmHg	Water Temp ref	: -
Salinity :	0 ppt	ID NO.	HS001
		Technician	: Kittipong M.

Calibration Details

Calibration Point	100% air sat. (@20 °C, DO = 9.09 mg/l)	(status)		(status)
Measurement 1 (mg/l)	9.08	(PASS)	-	-
Measurement 2 (mg/l)	9.08	(PASS)	-	-
Measurement 3 (mg/l)	9.08	(PASS)	-	-
Measurement 4 (mg/l)	9.07	(PASS)	-	-
Measurement 5 (mg/l)	9.07	(PASS)	-	-
Measurement 6 (mg/l)	9.07	(PASS)	-	-
Measurement 7 (mg/l)	9.07	(PASS)	-	-
Measurement 8 (mg/l)	9.07	(PASS)	-	-
Measurement 9 (mg/l)	9.07	(PASS)		-
Measurement 10 (mg/l)	9.07	(PASS)	-	-
Mean Measurement	9.07	mg/l	-	-
Inaccuracy	0.02	mg/l	-	-
Overall Status	(PASS)			

Manufacturer Specification
Accuracy = +/- 0.02 mg/l

1) This certificate is issued based on the result that are found as shown on date and place of test only.
2) The calibration procedure followec in accordance with Harikul Science Co., Ltd.
3) This result shall not be used for advertising purpose.

Technician Signature
(Kittipong Maekwong)

Laboratory Manager
(Natenapha Pisatkunchon)

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

CERTIFICATE No : 26M2268
REFERENCE No : 80204-3

Certificate of Calibration

EQUIPMENT	:	DIGITAL BALANCE
MANUFACTURER	:	SARTORIUS
MODEL	:	BSA224S-CW
SERIAL No	:	36591843
ID No	:	BA 09/61
CONDITION AS RECEIVED	:	USED ITEM
SUBMITTED BY	:	S.P.S. CONSULTING SERVICE CO., LTD. 7 SOI PHAHOLYOTHIN 24, PHAHOLYOTHIN RD., JOMPOL, CHATUCHAK, BANGKOK 10900
CALIBRATED BY	:	SUCHAT S.
CALIBRATION DATE	:	05-Mar-26
APPROVED BY	:	PONGSAK J.
ISSUED DATE	:	06-Mar-26
RECEIVED DATE	:	05-Mar-26

Certificate

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

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

Calibration Report

EQUIPMENT	:	DIGITAL BALANCE	**MODEL**	:	BSA224S-CW
MANUFACTURER	:	SARTORIUS	**S/N**	:	36591843
ID No	:	BA 09/61	**RECEIVED DATE**	:	05-Mar-26
AIR PRESSURE	:	1004mbar ± 1mbar	**CALIBRATION DATE**	:	05-Mar-26
AMBIENT TEMPERATURE	:	25° C ± 1° C	**RELATIVE HUMIDITY**	:	50 %RH ± 10 % RH

CONDITION OF THIS RESULTS OF CALIBRATION

1. THIS INSTRUMENT WAS CALIBRATED BY ACCORDING TO UKAS LAB 14 EDITION 6:2019 BY USING KNOWN WEIGHT STANDARD WEIGHT. THE BALANCE WAS NOT ADJUSTED BEFORE CALIBRATION. THE BALANCE HAS NO ZERO TRACKING FUNCTION. REPEATABILITY WAS MEASURED BY USING 10 REPEATED MEASUREMENTS. LINEARITY WAS MEASURED COVERING 10 POINTS, EVENLY SPREAD OVER THE RANGE. THE INSTRUMENT WAS SET ZERO BEFORE PERFORMING THE LINEARLITY TEST. OFF-CENTER LOADING WAS MEASURED BY USING STANDARD WEIGHTS PLACED ON THE PAN AND MOVED TO VARIOUS POSITIONS ON THE PAN.
2. REFERENCE STANDARD INSTRUMENTS :-

INSTRUMENT	MODEL	SERIAL No	CERTIFICATE No	DUE DATE
1) STANDARD WEIGHT SET	E2	QK-1-151	C02250116	28-Jan-27
2) STANDARD WEIGHT	E2	15843	C02250117	29-Jan-27

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

RESULT OF CALIBRATION :- WITHOUT ADJUSTMENT

1. ZERO SETTING FUNCTION : NORMAL
2. TARE FUNCTION : NORMAL
3. REPEATABILITY OF READING AT 200 g WAS 0.000055 g
4. DEPARTURE FROM NOMINAL VALUE/ LINEARITY

NOMINAL VALUE (g)	BALANCE READING (g)	CORRECTION (g)	UNCERTAINTY (± g)
0.0	0.0000	0.0000	0.00010
0.1	0.1000	0.0000	0.00011
0.2	0.2000	0.0000	0.00010
0.5	0.5000	0.0000	0.00011
1.0	1.0000	0.0000	0.00011
2.0	2.0000	0.0000	0.00011
5.0	5.0000	0.0000	0.00011
10.0	10.0000	0.0000	0.00011
20.0	20.0001	-0.0001	0.00011
50.0	50.0000	0.0000	0.00013
100.0	100.0001	-0.0001	0.00019
200.0	200.0001	-0.0001	0.00032

5. OFF CENTER LOADING ERROR



POINT	READING (g)
1	100.0000
2	100.0000
3	100.0000
4	100.0000
5	100.0000
OFF-CENTER LOADING	0.0000

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

END OF CALIBRATION REPORT

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

Cert. No. : SP25026
Pages : 1 of 4

Calibration Certificate

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

Calibrated by : Nitinun Srihawan

Approved by : Wichok B.
(Wichok Ekpongpradit)

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

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

Calibration Method :

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

Condition of this result of calibration :

1. Certified reference materials

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

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

Result of calibration : Wavelength Accuracy

(Without adjustment)

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

UUC* = Unit Under Calibration

Wichok B.

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

Result of calibration : Photometric Accuracy

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

UUC* = Unit Under Calibration

Wichok B.

SITHIPORN associates

SITHIPORN ASSOCIATES
CALIBRATION LABORATORY

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

Result of calibration : Photometric Accuracy

(Without adjustment)

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

UUC* = Unit Under Calibration

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

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

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

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

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

End of Calibration Certificate

MIRACLE INTERNATIONAL TECHNOLOGY CO.,LTD
214 Bangwaek Rd. Bangpai Bangkae Bangkok 10160
Tel.: 0-2865-4647-8 Fax: 0-2865-4649 http://www.mit.in.th

CALIBRATION CERTIFICATE

Certificate No. : S2025070410-0003
Date Issued : 24-Jul-25

Customer : S.P.S. CONSULTING SERVICE CO., LTD.
7 Soi Phaholyothin 24 Phaholyothin Road., Jompol, Chatuchak, Bangkok 10900

Equipment : Incubator

Manufacturer : BINDER
Model : BD 115
Serial No. : 12-16967
ID No./Tag No. : IN 05/56
Date Received : 22-Jul-25
Date Calibrated : 22-Jul-25

Calibrated by : Auttapol Kunaumpal

Calibration Method or Calibration Procedure Used

Standard method : CP-05 TLAS G-20.

This certificate is traceable to national standards, which realize the units of measurement according to the International System of Units (SI).

Result of Calibration

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

This certificate may not be reproduced other than in full except with the prior written approval of the Miracle International Technology Company Limited.

Approved by: K. Nathapong (Nathapong Krudaum)

CERTIFIED MIT

Certificate No. : S2025070410-0003
Environment : Ambient Temperature : Start record 25.1 °C, Stop record 25.1 °C
Relative Humidity : Start record 48.9 %RH, Stop record 49.3 %RH

Calibration Temperature (°C)	Setting Temperature (°C)	Indicating Temperature (°C)	Measured Stability[1] (°C)	Measured Uniformity[2] (°C)	Overall Variation[3] (°C)
35	35.0	35.0	0.13	0.37	0.57
41.5	41.5	41.5	0.10	0.35	0.49

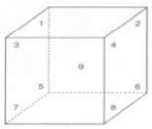
Without adjustment

Calibration Temperature (°C)	STD No. 1 (°C)	STD No. 2 (°C)	STD No. 3 (°C)	STD No. 4 (°C)	STD No. 5 (°C)	STD No. 6 (°C)	STD No. 7 (°C)	STD No. 8 (°C)	STD No. 9 (°C)	Uncertainty[4] (±°C)
35	34.97	34.91	34.96	34.82	34.81	34.86	34.83	35.11	34.95	0.23
41.5	41.51	41.37	41.40	41.26	41.27	41.42	41.43	41.53	41.50	0.23

STD = Standard

Note : Probe No. 9 is Reference Probe

Setting Air Fresh No. OFF



Condition As-Received : Used Item

The measurment results and statements of conformity with specification only relate to the item calibrated.

Measurement Standards Used & Traceability :

The International System of Units (SI) through

MIT Certificate No. L202412300-0027 for Temperature Indicator with Sensor Serial No. US37020317, Due 09-Sep-25

Notes : 1. The temperature stability is the one-half of greatest maximum difference of measured temperatures at any one probe.
2. The temperature uniformity is the maximum difference of measured temperatures between of any probes and the measured temperature at the reference location which are observed at same time.
3. Overall variation is the difference of maximum and minimum measured temperatures throughout observation time.
4. The uncertainty of measurement is included temperature stability.
5. The temperature uniformity, stability, overall variation and indicating temperature is applicable to all air or gas filled temperature controlled enclosures at atmospheric pressure.

End of Certificate

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

CERTIFICATE No : 26T2274
REFERENCE No : 80205-1

Certificate of Calibration

EQUIPMENT : WATER BATH
MANUFACTURER : MEMMERT
MODEL : WNB29
SERIAL No : L614.0123
ID No : WB 05/58
CONDITION AS RECEIVED : USED ITEM
SUBMITTED BY : S.P.S. CONSULTING SERVICE CO., LTD.
7 SOI PHAHOLYOTHIN 24, PHAHOLYOTHIN RD.,
JOMPOL, CHATUCHAK, BANGKOK 10900

CALIBRATED BY : CHARUKIT L.
CALIBRATION DATE : 05-Mar-26

APPROVED BY : PONGSAK J.
ISSUED DATE : 09-Mar-26
RECEIVED DATE : 05-Mar-26

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

Certificate

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

Calibration Report

EQUIPMENT	:	WATER BATH			
MANUFACTURER	:	MEMMERT	**MODEL**	:	WNB29
ID NUMBER	:	WB 05/58	**SERIAL NUMBER**	:	L614.0123
RECEIVED DATE	:	05-Mar-26	**CALIBRATION DATE**	:	05-Mar-26
AMBIENT TEMPERATURE	:	26 °C ± 1 °C	**RELATIVE HUMIDITY**	:	53 %RH ± 10 % RH

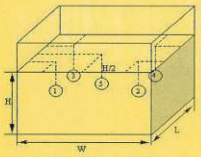
CONDITION OF THIS RESULTS OF CALIBRATION

1. THIS INSTRUMENT WAS CALIBRATED ACCORDING TO ASTM E715-80 (REAPPROVED 2001)BY COMPARISON WITH CALIBRATED RTD. THE PROBES WERE PLACED ON FIVE POINTS AND LOCATED ONE PROBE IN EACH OF THE FOUR CORNERS OF THE BATH AND PLACED THE FIFTH RTD WITHIN 2.5 cm. OF THE GEOMETRIC CENTER OF THE WATER VOLUME (REFERENCE LOCATION) UNDER NO LOAD CONDITION.
2. REFERENCE STANDARD INSTRUMENTS :-

INSTRUMENT	MODEL	SERIAL No	CERTIFICATE No	DUE DATE
1) DATA LOGGER WITH RTD	2625A	6603614	25T5341	04-Jun-26

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

RESULT OF CALIBRATION :- WITHOUT ADJUSTMENT



PROBE INSTALLATION POSITION IN THE BATH

GENERAL INFORMATION

Overall Variation of Ambient Temperature around the Bath (°C) : 0.8
Overall Variation of Line Voltage (V) : 6
Instrument Condition : Normal
Bath Inner Size (W*L*H) : 60*40*10 cm

BATH PERFORMANCE

Calibration Point (°C)	Controller Temperature (°C)	Temperature Stability (±°C)	Radius Uniformity (°C)	Axial Uniformity (°C)	Overall Variation (°C)
50.0	50.3	0.03	0.05	0.04	0.08
60.0	60.3	0.03	0.07	0.05	0.13

TEMPERATURE MEASUREMENT ACCURACY TEST

Controller Temp (°C)	Indicating Temp (°C)	Measured Temperature (°C) at Spread Locations					Uncertainty (± ° C)
		#1	#2	#3	#4	Ref. 5	
50.3	50.3	49.88	49.89	49.94	49.93	49.92	0.14
60.3	60.3	59.94	59.93	60.01	60.00	59.99	0.15

NOTE 1 : THE UNCERTAINTY OF MEASUREMENT EXCLUDED TEMPERATURE UNIFORMITY OF THE BATH.
NOTE 2 : THIS CALIBRATION WAS CARRIED OUT AT THE CUSTOMER'S PLACE AT LABORATORY AREA.
THE REPORTED UNCERTAINTY OF MEASUREMENT WAS BASED ON A STANDARD UNCERTAINTY MULTIPLIED BY A COVERAGE FACTOR k =2, PROVIDING A LEVEL OF CONFIDENCE APPROXIMATELY 95%.

END OF CALIBRATION REPORT

List of Instrument Certificates for Environmental Quality Analysis

No.	Instrument/Equipment	Parameter	Manufacturer	Model/Serial No.	Calibrator	Certification No.	Date of Calibration	Due date of Calibration*
1	Atomic Absorption Spectrometer	CADMIUM IRON LEAD	Agilent Technologies	AA240FS / MY13160001	Agilent Technologies (Thailand) Co.,Ltd.	Preventive Maintenance Checklist	26/1/2026	25/1/2027
2	Atomic Absorption Spectrometer	ARSENIC	Perkin Elmer	PinAAcle 900F / PFB20031902	Perkin Elmer Co.,Ltd.	Preventive Maintenance Report	27/10/2025	26/10/2026
3	Analytical Balance	TOTAL DISSOLVED SOLIDS	Mettler Toledo	XSR205DU / C210685394	United Analyst and Engineering Consultant.Co.,Ltd (UAE)	260311-2-BL001-26	12/3/2026	11/3/2027
4	Mercury Analyzer	MERCURY	NIC. Japan	RA-4500 / 17780278	Coax Group Corporation Ltd.	Preventive Maintenance Report	2/7/2025	1/7/2026
5	pH Meter	pH	Horiba	LAQUA-PH210 / HA0A0005	technology promotion association (thailand-japan	25CH1433	11/12/2025	10/12/2026
6	UV-VIS Spectrophotometer	NITRATE	Hitachi	U-2900 / 21E22-009	DQE Services Co.,Ltd.	SP25-021	26/5/2025	25/5/2026
7	Turbidity Meter (Portable)	TURBIDITY (NTU)	Oakton Instruments(China)	T100IR / 1120501017	Technology Promotion Association (Thailand-Japan)	25CH1053	9/9/2025	7/9/2026

Due Date of Calibration* : Based on the annual calibration plan. At least 1 time per year.

Agilent

Agilent AA Series Spectrometers

Preventative Maintenance Checklist

Foreword

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. This checklist will be completed at the end of the service and provided to you as a record of the installation.

NOTE While non-current production AA instrument and or accessory models are not covered specifically in this document it can be used as a basic reference.

For more information about Agilent Technologies services please visit our web site using the following URL http://www.agilent.com/en-us/services

เอกสารไม่ควบคุม

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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.

Service Engineer's Responsibilities

- Contact the customer and ensure that all necessary supplies are available before the preventive maintenance visit.
- Confirm the ability of the instrument to deliver continued safe operation as established via the Agilent AA safe operation flow chart. **(Refer directly to the AA 55/240/280 Preventive Maintenance Scope of Work to make this decision.)**
- 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.

This information is subject to change without notice.

Other important Customer Web links

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

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System information

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

Instrument system name and ID	240 FS AAS
Instrument system site and location	United Analyst and Engineering Consultant
List system component product numbers	List the serial numbers of each component
1 G 5432 A	1 MY 13160001
2	2
3	3
4	4
5	5
6	6
7	7
8	8
9	9
10	10

Preparation, Safe operation and Initial performance checks

☐ Agilent AA safe operation flow chart inspections (to determine if the PM can be performed).

NOTE If by following the flow chart the instrument is deemed to be unsafe for continued use you MUST NOT continue PM work. Inform the customer immediately of the Agilent recommendation that use of the instrument be discontinued.

☑ Discuss any specific questions or issues with the customer prior to starting.
☐ For HF application systems, if standard sample introduction system was not installed, ask the customer to install it. N/A
☑ 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

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- [x] Check for required firmware updates and verify with customers if they would like them installed.
- [x] Use SVD to perform a Full Wavelength Scan for Cu HCL - "As found test_1"
- [x] Perform a Basic Cu ABS test - "As found test_2"
- [x] Print the Details page or screen captures of the test results and attach to the end of this checklist.

Preventative maintenance procedures

Flame systems

- [ ] Section NOT applicable.

Electronic components

- [x] Review and confirm instrument configuration data in SVD
- [x] Confirm power supply voltages using the **SVD Power Supply diagnostic**.
- [x] For Dual Beam instruments - Confirm RBC frequency using the **SVD RBC frequency diagnostic**.

Mechanical components

- [x] Check the burner adjuster controls for complete and free movement. If the burner adjuster needs lubrication, use Molykote 321 or mineral-based molybdenum disulphide grease.
- [x] Run SVD tests to exercise all motor drives over the full range of their travel:
  - [x] Monochromator drive
  - [x] Slit drive
  - [x] Lamp selector
  - [ ] Automatic Burner Adjuster

Optics components

- [x] Check that external optical surfaces are clean – Clean or replace as required.
- [x] Use SVD and perform **Mono Wavelength Correction**.
- [x] Use SVD and perform **Slit Calibration**.
- [x] Use SVD and perform **Grating Squareness Diagnostic**.
- [x] Use SVD and perform **Zero Order Offset/Mono Correction**.
- [x] Use SVD and perform **Wavelength Repeatability**.
- [x] Physically inspect selected HC lamps (customer to supply per their choice) and measure the % Gain for each lamp. Advise customer if lamps are showing emission degradation due to age.
- [x] Check that the signal energy of the D2 and HC lamps track properly. Advise customer if their D2 lamp is showing emission degradation due to age.

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Sample introduction and Atomization

- [x] Inspect the burner interlock plate to ensure that the interlock pin is secure and correct for the burner type.
- [x] Clean the burner slot with a clean white card.
- [x] Check the uniformity of the slot width.
- [x] Clean the burner if required.
- [x] Change the burner o-ring and lubricate with PFPE grease.
- [x] Clean the nebulizer, spray chamber and liquid trap.
- [x] Change all o-rings and seals in the nebulizer, nebulizer block and spray chamber and lubricate.
- [x] Check that the pressure relief bung releases readily.
- [x] Change o-rings on the fuel and oxidant delivery barbs and lubricate.
- [x] Leave the liquid trap EMPTY and verify the flame will not ignite in this state.
- [x] Refill liquid trap and check that overfill drains freely into the drain/waste tube.
- [x] Check the drain/waste tube for good drainage. It should not have tight bends, kinks or loops and the lower end must be above the liquid level in the waste vessel.
- [x] Check and clean the igniter electrode.

Gas handling components and safety interlocks

- [x] Pressure test for leaks
- [x] Leak test gasbox internal components using gasbox leak tester G8434-67013
- [x] Check safety interlock status and operation using the **SVD interlock monitoring diagnostic**.

Analytical performance for Flame systems

- [x] Ignite a flame.
- [x] Check that you can adjust the nebulizer uptake rate from 4 to 6.5 mL per minute.
- [x] Optimize the instrument ready to perform Cu sensitivity test.
- [x] Create a manual method to perform a Basic Cu ABS test - "Final Performance Testing "
- [x] Run a PM completed sensitivity test for a 5 ppm copper sample and record the results in the AA PM Performance test results and measurements table.

Furnace systems

- [x] Section NOT applicable.

Electronic components

- [ ] Review and confirm instrument configuration data in SVD
- [ ] Confirm power supply voltages using the **SVD Power Supply diagnostic**.

Mechanical components

- [ ] Run SVD tests to exercise all motor drives over the full range of their travel:
  - [ ] Monochromator drive
  - [ ] Slit drive

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  - [ ] Lamp selector

Optics components

- [ ] Check that external optical surfaces are clean – Clean or replace as required.
- [ ] Use SVD and perform **Mono Wavelength Correction**.
- [ ] Use SVD and perform **Slit Calibration**.
- [ ] Use SVD and perform **Grating Squareness Diagnostic**.
- [ ] Use SVD and perform **Zero Order Offset/Mono Correction**.
- [ ] Use SVD and perform **Wavelength Repeatability**.
- [ ] Physically inspect selected HC lamps (customer to supply per their choice) and measure the % Gain for each lamp. Advise customer if lamps are showing emission degradation due to age.

Gas handling, water system, and workhead component checks

- [ ] Inspect the GTA workhead gas hoses and connections for leaks.
- [ ] Pressure test for gas leaks
- [ ] If the cooler system is accessible (stand-alone) check for correct operation and coolant/water level – this includes any temperature and pressure settings plus filter cleaning (air flow and water).
- [ ] Inspect the GTA workhead water hoses and connections for leaks.
- [ ] Check all graphite components and replace if necessary.
  - [ ] Tube
  - [ ] Electrodes
  - [ ] Shroud
- [ ] Check and clean the end windows on the workhead.
- [ ] Check safety interlock operation.

Analytical performance for Furnace systems

- [ ] Optimize the instrument ready to perform Cu sensitivity test.
- [ ] Run the sensitivity test for a 25 ppb copper sample and record the results in the results table.

PSD autosampler accessory for Furnace systems

- [x] Section NOT applicable.
- [ ] Check condition of the PSD capillary – replace if necessary
- [ ] Check condition and operation of PSD syringe – ensure it does not have air locks and bubbles.
- [ ] Change PSD rinse bottle o-ring.
- [ ] Check and clean the rinse vessel.
- [ ] Check the drain tube for good drainage. It should not have tight bends, kinks or loops and the lower end must be above the liquid level in the waste vessel.
- [ ] Ensure that the waste vessel is suitable for use with the furnace system.

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Accessories

- [ ] Section NOT applicable.

Sample introduction pump system (SIPS) accessory

- [x] Section NOT Applicable.
- [ ] Re-torque screws securing the hubs, presser arms and pump rotors.
- [ ] Adjust each roller so that it rotates freely.
- [ ] Wipe clean the pump rotor rollers and pump bands with a dry clean cloth.
- [ ] Ensure that the presser arms and the surfaces near the pump are free from dirt and spills.
- [ ] Remove the pump module rear cover and check for the incursion of liquids and any signs of corrosion.
- [ ] Re-torque the nuts that fasten the motor mounting plates to the chassis.
- [ ] Check clips securing the diluents holder and replace if necessary.
- [ ] Disconnect, clean T-piece, and reassemble the tubing using the following steps.
- [ ] Remove the T-piece by disconnecting the pump tubes, the pump bands and all other tubing.
- [ ] Place the T-piece in an ultrasonic bath containing strong detergent 1-5% Decon 30 or similar, for approximately 5-10 minutes.
- [ ] Wash the T-piece under a tap with a strong flow of water.
- [ ] Rinse with distilled water through all of the inlets in the reverse direction to normal sample flow.
- [ ] Reassemble.

Sample preparation system (SPS 4) accessory

- [x] Section NOT Applicable.

The Agilent SPS 4 autosampler is designed to need minimal maintenance.

The following maintenance requirements are suggested to maintain the performance of the autosampler.

- [ ] Cleaning the spill tray, rack location mat, end frames and chassis accessories with a damp soft cloth and diluted mild detergent.
- [ ] Cleaning the autosampler cover panels with domestic window cleaner.
- [ ] Checking the X- axis and Z- axis drive belts for cracks, splits, damaged teeth, excessive fraying, color changes or degradation from fumes.
- [ ] Check the X- axis, Theta- axis and Z- axis FFC cables for cracks, incorrect positioning, damaged edge or damaged connectors.

NOTE The autosampler requires no extra lubrication throughout its lifetime.

For further details refer to the SPS 4 service manual G8410-90050.

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Vapor generation accessory VGA (hydride generator)

- ☐ Section NOT Applicable.
- ☐ Inspect VGA gas supply hose.
- ☐ Inspect/replace VGA pump tubing.
- ☐ Check low gas pressure interlock setting– adjust if required.
- ☐ Check precision orifice gas flow setting – adjust if required.
- ☐ Check gas regulator pressure to 46 psi (325 kPa) – adjust if required.
- ☐ Clean the exterior surfaces of the accessory with soft lint free cloth. This cloth can be dampened with warm water or a mild detergent. Do not use organic solvents or abrasive cleaning agents.

UltrAA Lamp Accessory (external)

- ☑ Section NOT Applicable.
- ☐ Check the condition of the power cable.
- ☐ Clean the exterior surfaces of the accessory with soft lint free cloth. This cloth can be dampened with warm water or a mild detergent. Do not use organic solvents or abrasive cleaning agents.

Restore System

- ☐ If you have altered the customer's instrumentation during the course of PM, restore to the original status to allow the customer to conduct their normal activities (e.g., reload the customer's method.)

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.

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 this service, parts replaced, and test results obtained with the customer.
- ☐ If the instrument firmware was updated, record the details of the change in the Service Engineer's Comments box or if necessary, in the customer's IQ records.

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Test Results

Test description	Expected test result	Actual test result
Flame optics PMT Gain test		
For copper at 324.8 nm, 4 mA, 0.5 nm slit width	< 55 %	46 %
Flame performance test with 5 ppm copper sample		
Air /acetylene, mixing paddle removed	Abs value > 0.5	0.6331
Air /acetylene, mixing paddle installed. 10 replicates	%RSD < 1.0	0.7 %
Deuterium furnace optics PMT Gain test		
For copper at 324.8 nm, 4 mA, 0.5 nm slit width	< 55 %	-
Deuterium furnace performance test with 25 ppb copper sample (324.8 nm)		
Precision %RSD	≤ 4.0%	-
Abs value	≥ 0.15	-
Zeeman furnace analytical performance: 25 ppb copper sample (324.8 nm)		
Precision %RSD	≤ 4.0%	-
Abs value	≥ 0.15	-
MSR% (327.4 nm)	≥70 %	-

AA consumable and parts list

Part Description	Part Number	Product/Model # where used	PM supplied or Consumable	Instrument-Type
Test Solution – Cu 5ppm solution	6610030100	55 240 280	PM supplied	Common
Test Solution - Blank solution	5190-7001	55 240 280	PM supplied	Common
Copper, 1000 ug/ml, 100ml	5190-8279	55 240 280	*	Common
Kit, Mk 7 O-rings, aqueous, complete set	9910093400	55 240 280	PM supplied	Flame
Organic Kit	9910093500	55 240 280	PM supplied	Flame
Wire Nebulizer Cleaning	9910024700	55 240 280	consumable	Flame
Tubing-Capillary Std Nebs	9910024800	55 240 280	consumable	Flame
Capillary Tube Hivac Neb (3) (organics only)	9910044000	55 240 280	consumable	Flame
Glass impact beads (5/pk)	9910025700	55 240 280	consumable	Flame

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Teflon impact beads (5/pk): (organics only)	9910053300	55 240 280	consumable	Flame
Burner cleaning strip (100/pk)	9910053900	55 240 280	consumable	Flame
Window UV silica – round (right side)	2010082600	55 240 280	PM supplied	Common
Window UV silica – rectangular (left side)	2010082500	55 240 280	PM supplied	Common
Pad adhesive window (round)	4910012700	55 240 280	PM supplied	Common
Pad adhesive window (rectangular)	4910012800	55 240 280	PM supplied	Common
Electrode kit (1 pr) (D2)	6310003400	GTA120	PM supplied	Furnace
Shroud (D2)	6310003100	GTA120	PM supplied	Furnace
Zeeman electrode kit (1 pr)	6310003500	GTA120	PM supplied	Furnace
Zeeman shroud	6310003600	GTA120	PM supplied	Furnace
O-ring PSD rinse bottle	6910025900	PSD120	PM supplied	Furnace

* For engineers who only service AA instruments 5190-8279 can be used as a cheaper alternative for 6610030100.

Items classified as PM supplied in the above table are included in the standard PM.

Those classified as consumable should be provided by the customer or charged to the customer if supplied by the Agilent service engineer.

Service Engineer Comments (optional)

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

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Service Completion

Service Request Number: 6008058466
Service Engineer Name: Kanyakorn S.
Service Engineer Signature: Kanyakorn S.

Date of Service Completion: 26 Jan 2026
Customer Name: Monida Hanjo
Customer Signature:

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SVD Results Report

VARIAN

Report ID:3 *Diagnostic Start Time:1/26/2026 8:39:56 AM* *Diagnostic End Time:1/26/2026 9:05:49 AM*

Customer: UAE *Service Engineer:* Kanyakorn S.

Address: *Contact Details:* 026376363#1

Instrument Configuration

Configuration:

Serial Number: MY13160001
Instrument Model: Varian AA140/240/280
Flame Instrument: True
Furnace Instrument: True
Zeeman Present: False
Internal Zeeman: False
Internal UltrAA: False
Optics Type: Double Beam
D2 BG Correction Fitted: True
Boot Block Version: 1.09

Turret Type: Automatic
Number Of Lamps: 4
Mono Type: Automatic
Gasbox Type: 'Y' Gas Box
Auto Burner Adjuster: False
Mains Frequency: 50
Firmware Version: 2.11
Photomultiplier Type: Normal(900nm)
PWB Version: 45

EEPROM Data:

Instrument Run Hours: 79270.602
Zero Wavelength Offset: 30.095
Mono Correction: 0.765
Flame Hours: 35125.582

D2 Run Hours: 58906.000
D2 Serial Number: not set !
D2 Install Date: 1/1/1970
D2 Original Intensity: 1.000
D2 Last Intensity: 475.000

Frequency:

Averaging Period: 30.0
Datapoint Count: 20

Upper Limit: 51.00
Lower Limit: 49.00
Average Frequency: 50.00
Highest Measured Frequency: 50.00
Lowest Measured Frequency: 50.00

Result: Passed

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Power Supply:

Averaging Period: 30.0
Datapoint Count: 20

	Lower Limit (V)	Actual (V)	Upper Limit (V)	Result:
12.00 V Rail	10.80	12.20	13.20	Passed
-12.00 V Rail	-13.20	-11.90	-10.80	Passed
5.00 V Rail	4.50	5.02	5.50	Passed
310.00 V Rail	279.00	320.00	341.00	Passed

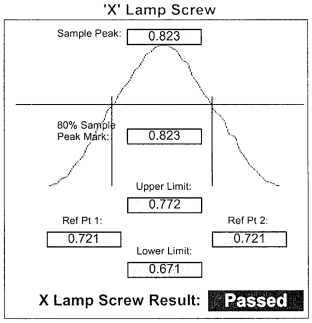
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Optics

Beam Balance:

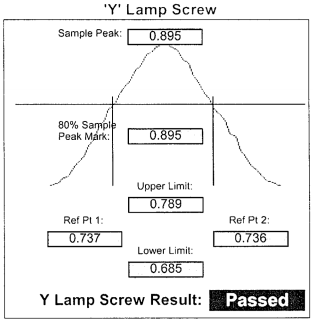
Lamp Type: Copper
Lamp Socket Used: 3
Peak Selected: 324.80
Lamp Alignment: Performed

'X' Lamp Screw



X Lamp Screw Result: Passed

'Y' Lamp Screw



Y Lamp Screw Result: Passed

Grating Squareness:

Lamp Element(s): Copper
Lamp Turret Position: 3
Lamp Current(mA): 4.00
Slit Width(nm): 0.5
1st Order Wavelength(nm): 324.80
Lamp Alignment: Performed

	Lower Limit (nm)	Actual (nm)	Upper Limit (nm)	Result:
Zero Order	-0.10	0.00	0.10	Passed
First Order	324.45	324.74	325.15	Passed
Second Order	649.23	649.50	649.97	Passed

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Wavelength Repeatability:

Lamp Used: Copper
Peak Used(nm): 324.750
Connected to Socket: 3
Lamp Current(mA): 4
Slit Width(nm): 0.2
Slit Height: Normal

Lamp Alignment: Performed

Lower Limit(nm) 324.768 324.888 **Upper Limit(nm)**

	(Approach from Zero Order)	*(Approach from end)*
Sample 1:	324.828	Sample 2: 324.823
Sample 3:	324.823	Sample 4: 324.823
Sample 5:	324.823	Sample 6: 324.819
Sample 7:	324.823	Sample 8: 324.819
Sample 9:	324.819	Sample 10: 324.819

Mean: 324.823 **Standard Deviation:** 0.003

Result: Passed

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Mechanical

Wavelength Drive: Passed

Slit Drive: Passed

Turret Drive: Passed

Auto Burner Adjuster Drive: Untested

Miscellaneous

Signal Processing Linearity:

Calculate Mode: New Calc Mode

	Lower Limit	Actual	Upper Limit	Result:
S0	114	261	297	Passed
S1	156	165	191	Passed
S2	271	296	332	Passed
S3	474	508	579	Passed
S4	825	919	1008	Passed
S5	1435	1529	1754	Passed
S6	2498	2771	3053	Passed
S7	4347	4755	5313	Passed

Interlocks:

Burner Fitted:	Working	Flame Detect:	Working
N2O Burner Fitted:	Untested	GCU Active:	Working
Flame Shield Closed:	Working	Oxidant Pressure:	Working
Gas Control Fitted:	Untested	Oxidant Changeover:	Untested
Pressure Release Bung Fitted:	Working	Ignition:	Working
Liquid Trap Fitted:	Working		

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Auto Lamp Recognition:

Lamp 1: 87 - Silver/Cadmium/Lead/Zinc(UltrAA) (Ag/C	**Lamp 5:** Not Supported
Lamp 2: 68 - Zinc (Zn)	**Lamp 6:** Not Supported
Lamp 3: 14 - Copper (Cu)	**Lamp 7:** Not Supported
Lamp 4: Uncoded Lamp/Not Connected	**Lamp 8:** Not Supported

Result: Passed

GTA Temperature Monitoring: Not Performed

Notes:

Signatures:

Hamida Hagi	26 Jan 26	Kanyakorn S.	26 Jan 2026
UAE	Date	Kanyakorn S.	Date

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Sequential by time report 1/26/2026 9:54 AM Page 1 of 1 SpectrAA

Analyst
Date Started 1/26/2026 9:07 AM GMT: 1/26/2026 2:07 AM
Worksheet Sensitivity Test
Comment
Methods Cu
Computer name DESKTOP-R9UIFRS
Serial Number: MY13160001

Method: Cu (Flame)

Sample ID	Exp Abs	%RSD	Mean Abs			
5 ppm Cu	0.633	1.4	0.6331			
	Readings					
	0.6413	0.6340	0.6241	1/26/2026		

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Sequential by time report 1/26/2026 10:15 AM Page 1 of 1 SpectrAA

Analyst
Date Started 1/26/2026 9:07 AM GMT: 1/26/2026 2:07 AM
Worksheet Precision Test
Comment
Methods Cu
Computer name DESKTOP-R9UIFRS
Serial Number: MY13160001

Method: Cu (Flame)

Sample ID	Exp Abs	%RSD	Mean Abs				
5 ppm Cu	0.618	0.7	0.6180				
	Readings						
	0.6145	0.6187	0.6081	0.6168	0.6253	0.6196	
	0.6197	0.6195	0.6188	0.6189	1/26/2026		

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PinAAcle 900F Preventive Maintenance Report

Company Name: UAE Consultant Co., LTD.

Instrument Location: 41 Sukumvhit Rd.,

Phra Khanong, Bangkok 10260

Instrument Serial No.: PFBS20031902

Date: 27 Oct 2025

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PinAAcle 900F Preventive Maintenance (PM)

Company Name:	United Analyst and Engineering Consultant Co., LTD.		
Address (Instrument Location):	41 Sukumvhit Rd., Phra Khanong, Bangkok 10260		
Serial Number:	PFBS20031902	**PM Number:**	1 of 2
Customer Name (if applicable):	K. Yainda	**Telephone Number:**	095-5580049
Customer Support Engineer Name:	K. Chayanan	**Service Order Number:**	WO-06332081
Date PM Performed: (DD-MMM-YYYY)	27 Oct 2025	**Next PM Due Date:** (DD-MMM-YYYY)	27 Apr 2026
Standard Labor Hours to Complete PM :		**5 hours**	

Part Number	Release	Publication Date	
09370145 Rev.9	A	January 2018	PerkinElmer

Scope
The purpose of this PM is to ensure the continued functionality of the PinAAcle 900F by inspecting and replacing any worn or damaged parts. This service should only be performed by a trained representative of PerkinElmer.
The customer should save their method before the PM begins.

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

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Component List

Component / Specific Model	Serial #	Configuration Notes
PinAACle900F	PFBS20031902	Syngistix V.4.0.1.1935
FIAS100	100S24040501	

Parts Lists

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

Additional Reagents and Standards Required for PM				
Part Number (if applicable)	**Description**	**Quality**	**Batch/Lot #**	**Expired Date** (MM/YY)
N9300183	1000 mg/L Copper Standard	AR	28-83CUY1	Nov 2026

Additional Reagents and Standards Required for PM (Customer Support Solution)				
Part Number (if applicable)	**Description**	**Quantity**	**Batch/Lot #**	**Expiration Date** (MM/YY)
N/A	DI Water	250 ml.	AR	AR
N/A	0.5% HNO_3	250 ml.	AR	AR

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Additional Tools Required for PM			
Part Number (if applicable)	**Description**	**Quantity**	**Serial #**
N1013000	0.2A Neutral density filter	1	101N0089015
N1013002	1.0A Neutral density filter	1	101N0089015
03030997	System 2 EDL Driver	1	03030997
N3050605	As System 2 EDL	1	16148
N3050121	Cu Lumina HCL	1	060419-030180
N3050109	Ba Lumina HCL	1	061219-020041
N3050139	K Lumina HCL	1	030819-010130
N3050152	Ni Lumina HCL	1	052719-020020

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Procedure Checklist

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

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

2. **PC Instrument Software:**
   - ☑ Instrument Software user files/databases archived, packed, and/or deleted as needed.

3. **Mechanical:**
   - ☑ Inspect and clean all fans and filters. Replace filters if necessary
   - ☑ Inspect all gas lines for leaks and/or wear. Replace if needed.
   - ☑ Clean exterior of the instrument.
   - ☑ Inspect the burner head, burner chamber, and nebulizer. Clean if needed as stated in the Hardware Guide.
   - ☑ Check burner head dimensions with the feeler gauge as stated in the Hardware Guide in the Maintenance chapter section on cleaning the burner head and checking sloth width. Replace if out of specification
   - ☑ Check the condition of the end cap, burner head, and nebulizer O-rings. Replace if necessary.
   - ☑ Check the drain system for signs of wear. Replace worn or damaged parts.
   - ☑ Visually check for proper flame conditions when igniting the Air-C2H2 and N20-C2H2 flames (if applicable).

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

5. **Optics:**
   - ☑ Inspect and clean the sample compartment windows, if needed.
   - ☑ Inspect optics. Clean or replace if necessary,

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

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7. **Flame Interlock Check:**

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

Parameter	Specification	Test Results	Pass/Fail
Flame Sensor	Air/C_2H_2 Flame correctly shuts down	Active	Passed
Drain Sensor	Air/C_2H_2 Flame correctly shuts down	Active	Passed
Nebulizer Sensor	Air/C_2H_2 Flame correctly shuts down	Active	Passed
C_2H_2 Pressure Sensor	Air/C_2H_2 Flame correctly shuts down	Active	Passed
Air Pressure Sensor	Air/C_2H_2 Flame correctly shuts down	Active	Passed
Burner Head Sensor	Choosing Nitrous Oxide as the oxidant should trigger an interlock shuts down	Active	Passed

8. **After PM Performance tests:**

8.1 Detector Linearity with Barium

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

Parameter	Specification	Certificate Value at 553.6 nm (Abs.)	Test Results	Pass/Fail
1.0 A ND Filter	± 5% from Cert.	0.9995	0.9887	Passed
0.2 A ND Filter	± 5% from Cert.	0.1936	0.1896	Passed

8.2 Baseline Noise at 1.0 Absorbance with Barium

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

Parameter	Specification	Results	Pass/Fail
Standard Deviation	≤ 0.010	0.001	Passed

8.3 AA Baseline Noise with Copper

Description: Check baseline noise.

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

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8.4 D_2 Background Compensation with Copper

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

Parameter	Specification	Results	Pass/Fail
Standard Deviation	≤ 0.010	0.0001	Passed

8.5 AA-BG Baseline Noise with Copper

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

Parameter	Specification	Results	Pass/Fail
Standard Deviation	≤ 0.005	0.0001	Passed

8.6 AA-BG Baseline Noise with Arsenic

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

Parameter	Specification	Results	Pass/Fail
Standard Deviation	≤ 0.005	0.0004	Passed

8.7 Flame Sensitivity

Description: Instrument Sensitivity checked against Copper standard.

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

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

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Additional Comments

Additional Comments Regarding the PM

Review

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

This PinAAcle 900F Passes ☑ Fails ☐ the preventive maintenance.

Review of Preventive Maintenance:

Authorized PerkinElmer Representative:	Date: 27 Oct 2025 (DD-MMM-YYYY)
Authorized Customer Representative:	Date: 27 Oct 2025 (DD-MMM-YYYY)

เอกสารไม่ควบคุม

Atomic Absorption/FIAS 100/400 Preventive Maintenance (PM)			
Company Name:	United Analyst and Engineering Consultant Co., LTD.		
Address (Instrument Location):	41 Sukumvhit Rd., Phra Khanong, Bangkok 10260		
Room Number:	Lab		
Asset Number (if applicable):	1 of 2	**Customer System ID:**	K. Yanida
Service Engineer Name:	K. Chayanan	**Service Order Number:**	WO-06332087
Date PM Performed: (DD-MMM-YYYY)	27-Oct-2025	**Next PM Due Date:** (DD-MMM-YYYY)	27-Apr-2026

Part Number	Release	Publication Date	PerkinElmer®
09370005	C	January 2013	

Scope
The purpose of this PM is to ensure the continued functionality of the Atomic Absorption/FIAS 100/400 by inspecting and replacing any worn or damaged parts. This service should only be performed by a trained representative of PerkinElmer.
The customer should save their method before the PM begins.

General Instructions:
Always check with the customer before making any changes that may affect the customer's analysis or calibration.
The completed document should be signed by an authorized PerkinElmer and customer representative and left with the customer.
Update the PM sticker and instrument logbook as required.

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Component List

Component / Specific Model	Serial #	Firmware Version	Configuration Notes
FIAS100	100S24040501	2.20	Syngistix V4.0.1.1935

Parts Lists

Parts Included with the PM				
Part Number (if applicable)	**Description**	**Quantity**	**Batch/Lot #**	**Expiration Date** (MM/YY)
B050 2706	Fan Filter	1	N/A	N/A

Additional Tools Required for PM				
Part Number (if applicable)	**Description**	**Quantity**	**Serial #**	**Calibration Due Date** (MM/YY)
N/A	Digital Volt Meter	1	N/A	N/A
Additional Reagents and Standards Required for PM				
Part Number (if applicable)	**Description**	**Quantity**	**Batch/Lot #**	**Expiration Date** (MM/YY)
N/A	N/A	N/A	N/A	N/A

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Procedure Checklist

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

1. **General:**
   - ☑ Review the instrument performance with the customer and document any recent problems.

     _____

   - ☑ Is the Working Environment Acceptable? If not, document.

     _____

   - ☐ Visual Damage (if yes, describe)

     _____

   - ☑ Check incoming AC line voltage for proper levels and grounding.
   - ☑ Verify Voltage switch on back of instrument is correct
   - ☑ Perform general inspection of system for cleanliness. Clean if needed.
   - ☑ Gas supply cylinders secured, lines leak checked and argon or nitrogen supply pressure verified (45 – 58 psi).
   - ☑ Inspect the customer log book and make any appropriate PM entries.
   - ☑ Fan checked and filter cleaned
   - ☑ Heating mantle or Universal Cell Holder checked

2. **Instrument components**
   - ☑ Non-return valve checked/repaired/replaced if needed (B019 8111). Clean the valve if there is any liquid in it. Replace the rubber sleeve (B013 5123) if it is worn. Check the flow meter for any signs of fluid in it. Clean the flow meter if needed.
   - ☑ Verify condition of pump pressure adjustment levers (B050 7794 - look for cracks or problems with the springs), pump rollers (B300 0251 check for wear), and thumb screws (B050 7796).
   - ☑ Check the Multiport valve for proper switching, flow, and insure there are no leaks. Clean valve parts and replace o-rings if needed (large o-ring: B050 1250, small o-ring: B004 5095). Use a squirt bottle & fishing line to try to dislodge clogs.
   - ☑ Firmware Version checked. Latest is 2.20.

3. **Mixing/Separation Assembly & Pump Tubing:**
   - ☑ Mixing separator assembly checked
   - ☑ Filter/membrane checked (B050 8306)
   - ☑ Condition of the pump tubing (replace if necessary), correct pump tubing for the solutions being run. Make sure the correct magazines are being used. B050 7791 for 0.13 – 1.80 mm tubing; B050 7792 for 1.60 – 3.18 mm tubing.

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4. **Cell, Cell Windows, Transfer Line:**
   - ☑ Cell checked
   - ☑ Cell windows checked
   - ☑ Transfer line checked for moisture (if moisture is a problem, the Nafion dryer might be needed)

5. **Operational Tests:**
   - ☑ Run DI water through the carrier/reductant/sample system. Verify smooth flow of liquid throughout without leaks. Replace tubing & fittings if needed.

6. **Review:**
   - ☑ Review with the customer PM work performed.
   - ☑ Review with the customer routine maintenance procedures.
   - ☑ Discuss recommended customer-supplied materials to have on hand.
   - ☑ Attach PM sticker.
   - ☑ Update Logbook.

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Additional Comments

Additional Comments Regarding the PM

Review

The preventive maintenance checks and if applicable performance tests for FIAS 100/400 have been completed. ***This FIAS 100/400 Passes*** ☑ ***Fails*** ☐ ***the preventive maintenance.***	
Review of Preventive Maintenance:	
Authorized PerkinElmer Representative: Chayanam K.	Date: 27 Oct 2025 (DD-MMM-YYYY)
Authorized Customer Representative: ญาณิชาดา	Date: 27 Oct 2025 (DD-MMM-YYYY)

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Document History

Revision	Description of Change	Page(s)	Date
A	First release		May 2008
B	Addition of Batch/Lot Number, Expiration Date, and Report Fields.	2,7	February 2009
C	Update to new format	All	January 2013

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PerkinElmer

PerkinElmer TruQ

PerkinElmer Number: N9300183
Element and Matrix: 1000 µg/mL Copper in 2% HNO3
Starting Material: Copper Metal
Starting Material Lot No: 10221A
Density: 1.011 g/mL @ 20°C

Lot No: 28-83CUY1
Certification Date: MAY -- 2025
Expiration Date: NOV 30 2026

Trace Metallic Impurities in the Actual Solution via ICP / ICP-MS Analysis:

Element	µg/mL	Element	µg/mL	Element	µg/mL	Element	µg/mL	Element	µg/mL
Ag	0.005	Dy	<0.001	Li	<0.001	Pt	<0.001	Tb	<0.001
Al	<0.002	Er	<0.001	Lu	<0.001	Rb	<0.001	Te	<0.001
As	<0.001	Eu	<0.001	Mg	<0.001	Re	<0.001	Th	<0.001
Au	<0.001	Fe	0.02	Mn	<0.001	Rh	0.002	Ti	<0.001
B	<0.001	Ga	<0.001	Mo	<0.001	Ru	<0.001	Tl	<0.001
Ba	<0.001	Gd	<0.001	Na	0.004	Sb	<0.001	Tm	<0.001
Be	<0.001	Ge	<0.001	Nb	<0.001	Sc	<0.001	U	<0.001
Bi	<0.001	Hf	<0.001	Nd	<0.001	Se	<0.002	V	<0.001
Ca	<0.01	Hg	<0.001	Ni	<0.001	Si	<0.1	W	<0.001
Cd	<0.001	Ho	<0.001	P	<0.2	Sm	<0.001	Y	<0.001
Ce	<0.001	In	<0.001	Pb	0.005	Sn	0.003	Yb	<0.001
Co	<0.001	Ir	<0.001	Pd	<0.001	Sr	<0.001	Zn	0.02
Cr	<0.001	K	<0.1	Pr	<0.001	Ta	<0.001	Zr	<0.001
Cs	<0.001	La	<0.001						

Traceability Documentation for Solution Standard:

Certified Value: 999 µg/mL ±5 µg/mL (refer to side 2)
Certified Value is Traceable to: NIST SRM #3114
*** Classical Wet Assay:** 997 µg/mL
Method: EDTA titration using PAN as indicator. EDTA standardized against $Pb(NO_3)_2$, NIST SRM #928.

***Instrument Analysis using ICP Spectrometer:** 1001 µg/mL
via NIST SRM #3114

We guarantee that our PerkinElmer TruQ Atomic Spectroscopy Standards are stable and accurate to ±0.5% of certified concentration until the expiration date, provided the standards are kept tightly capped and stored under normal laboratory conditions. This value is the sum of cumulative errors associated with the analytical determinations, pipetting, and diluting to final volume. For these solutions we use high purity acids, ASTM Type 1 water (18 megohm double deionized), and leached, triple-rinsed bottles. All glassware used is class A.

Certifying Officer: Y. Parikh
Yogesh Parikh, Senior Spectroscopist

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http://www.perkinelmer.com

Service Report

Work Order Number	Activity Code	Billing Type	Requested Start Date	Model	Serial Number
WO-06332081	Planned Maintenance	Contract	28/04/2568 10:27 น.	AAN3200051	PFBS20031902
Service Representative Name	**Contract Number**		**Expiry Date**	**Equipment ID**	**System ID**
Kanan, Chayanan	SC-0035664109		31/10/2025	N/A	N/A
UDI Number					
N/A					

Equipment Location	Bill To Name
บริษัท ยูไนเต็ด แอนะลิสต์ แอนด์ แชวงบางจาก เขตพระโขนง กรุงเทพมหานคร 51 10260 TH	บริษัท ยูไนเต็ด แอนะลิสต์ แอนด์ แชวงบางจาก เขตพระโขนง กรุงเทพมหานคร 51 10260 TH

Customer Contact	Phone Number	Fax Number	Email	Purchase Order
ญาณินดา แซ่มเล็ก(ไบหม่อน)	095-5580049	N/A	yanindachamlek@gmail.com	HPO-250100002

Work Description

- PM 1/2 (AAเครื่องเก่า)
- Cleaning Cell, Chamber, Filter
- Wavelength Calibrate ; Pass
- Wavelength Scan As,Cu,Ba,K,Ni ; Pass
-Align cell with Hg, : OK

Start Date	End Date	Work Description
27/10/2025	27/10/2025	
27/10/2025	27/10/2025	

Tools Used

Quantity	Calibrated Tool	Description	Serial Number	Last Calibration Date	Next Calibration Date
*** No Calibrated Tools Used ***					

Material Used

Part Number	Part Description	Note	Lot/Serial Number	Quantity
N9301714	Balston C2H2 Filter Cartridge			1

Labour Details

Part Number	Part Description	Start Date	Quantity
SV000013	Preventative maintenance	27/10/2025	4
SV000002	Service Travel	27/10/2025	2

Work Complete	Customer Signature	Technician Signature
Yes ☑ No ☐ PM/OQ/IPV Left with Customer Yes ☐ No ☑	ญาณินดา 2/11/2568 ญาณินดา แซ่มเล็ก(ไบหม่อน)	Chayanam K. 2/11/2568 Kanan, Chayanan

เอกสารไม่ควบคุม

Terms & Conditions
Customer Acknowledgment of receipt of the above repair / replacement.
Special Terms and Conditions: This is not an invoice.
Taxes will be applied to your invoice if applicable.

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PerkinElmer
For the Better

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Tel: 66 2719 6420 ; Fax: +66 2 319 7900
http://www.perkinelmer.com

Service Report

100S24040501

Work Order Number	Activity Code	Billing Type	Requested Start Date	Model	Serial Number
WO-06332087	Planned Maintenance	Contract	28/04/2568 10:29 น.	FIAS100	~~100S20040201~~

Service Representative Name	Contract Number	Expiry Date	Equipment ID	System ID
Kanan, Chayanan	SC-0035664109	31/10/2025	N/A	N/A

UDI Number
N/A

Equipment Location	Bill To Name
บริษัท ยูไนเต็ด แอนนาลิสต์ แอนด์ แชวงบางจาก เขตพระโขนง กรุงเทพมหานคร 51 10260 TH	บริษัท ยูไนเต็ด แอนนาลิสต์ แอนด์ แชวงบางจาก เขตพระโขนง กรุงเทพมหานคร 51 10260 TH

Customer Contact	Phone Number	Fax Number	Email	Purchase Order
ญาณินดา แซ่มเล็ก(ใบหม่อน)	095-5580049	N/A	yanindachamlek@gmail.com	HPO-250100002

Work Description

- PM 1of 2 (S/N_100S24040501)
- Cleaning Port Vale, Manifold, Tuning
- Run Hg test ; Pass

Start Date	End Date	Work Description
27/10/2025	27/10/2025	
27/10/2025	27/10/2025	

Tools Used

Quantity	Calibrated Tool	Description	Serial Number	Last Calibration Date	Next Calibration Date
*** No Calibrated Tools Used ***					

Material Used

Part Number	Part Description	Note	Lot/Serial Number	Quantity
B0194049	Sample Loop, 500UL			1
B0501250	O-Ring 18.77 x 1.78			1
B0500748	O-RING 16 X 1,75 VITON			2

Labour Details

Part Number	Part Description	Start Date	Quantity
SV000013	Preventative maintenance	27/10/2025	3
SV000002	Service Travel	27/10/2025	2

Work Complete	Customer Signature	Technician Signature
Yes ☑ No ☐	ญาณินดา	Chayanan K.
PM/OQ/IPV Left with Customer	3/11/2568 ญาณินดา แซ่มเล็ก(ใบหม่อน)	3/11/2568 Kanan, Chayanan
Yes ☐ No ☑		

เอกสารไม่ควบคุม

Terms & Conditions
Customer Acknowledgment of receipt of the above repair / replacement.
Special Terms and Conditions: This is not an invoice.
Taxes will be applied to your invoice if applicable.

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Tel.0 2763 2828 Fax 0 2763 2800 www.uaeconsultant.com E-mail: uae@uaeconsultant.com

Certificate of Calibration

Certificate No.: 260311-2-BL001-26
Code No.: BL001-26
Page: 1 of 4

Customer Name: United Analyst and Engineering Consultant Co., Ltd.
Address: 3 Soi Udom suk 41, Sukhumvit Rd., Bang Chak, Phar Khanong, Bangkok 10260

Equipment: Electronic Balance
Manufacturer: Mettler Toledo
Model: XSR205DU
Serial No.: C210685394
Asset No. : UAE.WAO.010/2565
Building : UAE number 3 Floor : 2 Room : 208

Received Date: March 11, 2026
Date of Calibation : March 12, 2026
Calibration Conditions: Temperature 23.0 °C to 23.6 °C
Humidity 51.5 % to 54.4 %
Pressure 755.7 mmHg to 757.9 mmHg

Calibrated by: Thanachat Chatpahol

Approved by: Suwit Chotnok Signature:

Issued Date: March 16, 2026

Note : 1) The Uncertainties are for a confidence probability of approximately 95%
2) This Certificate is valid only to the item calibrated on date and place of calibration.
3) 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 United Analyst and Engineering Consultant Co.,Ltd. (UAE)

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United Analyst and Engineering Consultant Co., Ltd.
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Tel.0 2763 2828 Fax 0 2763 2800 www.uaeconsultant.com E-mail: uae@uaeconsultant.com

Equipment: Electronic Balance
Model: XSR205DU
Serial No.: C210685394
Max. Capacity: 81 g / 220 g
Calibration Date: March 12, 2026
Condition As-Received: In Condition
Manufacturer: Mettler Toledo
Readability: 0 to 81 (g): 0.01 mg , > 80 to 200 (g) : 0.1 mg
ID No.: UAE.WAO.010/2565

Condition of Equipment:

Condition of This Result of Calibration:

1. Calibration Method: This instrument was calibrated by method UAE.CP-CAL.006 In-House Method based on LKAS Lab 14 : 2022
2. Reference Standrads:

Reference Standard:	Model	Serial No.	Calibrated By	Certificate No.	Traceability	Due Date
Standard Weight Class E2 (OIML)	1 mg to 1 kg	C510641605	METTLER TOLEDO GmbH	C510641605	METTLER TOLEDO GmbH	3-Mar-27
Standard Weight Class E2 (OIML)	1 mg to 1 kg	B749109122	AMARC	25-009359	AMARC	21-Jan-27

Instrument	Model	Serial No.	Calibrated By	Certificate No.	Traceability	Due Date
Thermo-Hygro-Baro Meter	MHB-382SD	AK46457	SUCCESS	SG-H-00992/68	Success Gateway	26-Nov-26
Thermo-Hygro-Baro Meter	MHB-382SD	AK46457	TPA	25P4464	TPA	18-Dec-26

3. This certification is traceable to SI Unit
4. This certification was certified only for the instrument we calibrated
5. This result of calibration wae found accurate as show on date and place of calibration only.
6. Through the reference standard laboratory of Mettler-Toledo GmbH C510641605, SAS accreditation number SCS 0032
7. Through the reference standard laboratory of AMARC 25-009359, TISI accreditation number 0152

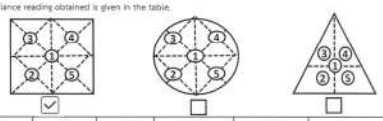
Calibraton Result:

1. Repeatability of Reading:

Nominal Value (g)	Standard Deviation of Reading (g)
80	0.000019
200*	0.000055

2. Eccentric or off-center loading

A mass of 100 g was placed and moved to various position on pan
The Balance reading obtained is given in the table.



1 (g)	2 (g)	3 (g)	4 (g)	5 (g)	Maximum Difference (g)
100.0002	100.0002	100.0003	100.0004	100.0003	0.0001

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Tel.0 2763 2828 Fax 0 2763 2800 www.uaeconsultant.com E-mail: uae@uaeconsultant.com

Equipment: Electronic Balance
Model: XSR205DU
Serial No.: C210685394
Max. Capacity: 81 g / 220 g
Calibration Date: March 12, 2026
Manufacturer: Mettler Toledo
Readability: 0 to 81 (g): 0.01 mg , > 80 to 200 (g) : 0.1 mg
ID No.: UAE.WAO.010/2565

Calibraton Result: (Continued)
Calibraton Range: 0 to 80 (g)
Calibraton Adjustment: Internal Calibration

3. Error of indication from nominal or conventional mass value: (Range: 0 to 81 (g) ; Resolution: 0.00001 g)

Nominal Value (g)	Reference Value (g)	Indication (g)	Correction (g)	Uncertainty (± mg)	Coverage Factor k
Unload	0.0000000	0.00000	0.00000	0.032	2.65
0.001	0.0010020	0.00101	0.00000	0.032	2.65
0.005	0.0050025	0.00501	-0.00001	0.032	2.65
0.01	0.0100005	0.01001	-0.00001	0.032	2.65
0.05	0.0500003	0.05001	-0.00001	0.032	2.65
0.10	0.1000083	0.10000	0.00001	0.033	2.65
0.50	0.5000121	0.50001	0.00000	0.033	2.65
1	1.0000119	1.00003	-0.00002	0.032	2.52
2	2.0000125	2.00003	-0.00002	0.033	2.52
5	5.0000146	5.00003	-0.00002	0.033	2.32
10	10.0000330	10.00006	-0.00003	0.034	2.21
20	20.000028	20.00006	-0.00003	0.041	2.07
30	30.000061	30.00017	-0.00011	0.055	2.00
40	40.000054	40.00021	-0.00016	0.066	2.00
50	50.000037	50.00023	-0.00019	0.068	2.00
60	60.000070	60.00029	-0.00022	0.084	2.00
80	80.000098	80.00039	-0.00030	0.12	2.00

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Tel.0 2763 2828 Fax 0 2763 2800 www.uaeconsultant.com E-mail: uae@uaeconsultant.com

Equipment: Electronic Balance
Model: XSR205DU
Serial No.: C210685394
Max. Capacity: 81 g / 220 g
Calibration Date: March 12, 2026
Manufacturer: Mettler Toledo
Readability: 0 to 81 (g): 0.01 mg , > 80 to 200 (g) : 0.1 mg
ID No.: UAE.WAO.010/2565

Calibraton Result: (Continued)
Calibraton Range: > 81 to 200 (g)
Calibraton Adjustment: Internal Calibration

3. Error of indication from nominal or conventional mass value: (Range: > 81 - 220 (g) ; Resolution: 0.0001 g)

Nominal Value (g)	Reference Value (g)	Indication (g)	Correction (g)	Uncertainty (± mg)	Coverage Factor k
Unload	0.0000000	0.0000	0.0000	0.032	2.65
90	90.0000910	90.0004	-0.0003	0.16	2.00
100	100.0000420	100.0003	-0.0003	0.16	2.00
110	110.0000750	110.0004	-0.0003	0.18	2.00
120	120.0000680	120.0004	-0.0003	0.19	2.00
130	130.0001010	130.0005	-0.0004	0.20	2.00
140	140.0000960	140.0004	-0.0003	0.21	2.00
150	150.0000790	150.0005	-0.0004	0.22	2.00
160	160.0001120	160.0004	-0.0003	0.23	2.00
170	170.0001050	170.0003	-0.0002	0.24	2.00
200	200.0001460	200.0001	0.0000	0.26	2.00

4. Effect of Tare test:

Tare Load (g)	Test Load (g)	Indication (g)	Correction (g)
100	20.000028	20.0001	0.0000
	40.000054	40.0001	0.0000
	60.000070	60.0000	0.0001
	80.000098	80.0000	0.0001
	100.000109	100.0000	0.0001

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

o---o-End-o---o

เอกสารไม่ควบคุม

TECHNOLOGY PROMOTION ASSOCIATION (THAILAND-JAPAN)
CORPORATE SERVICES 3: EQUIPMENT CALIBRATION AND TESTING SERVICES
534/4 PATTANAKARN ROAD SOI 18, SUANLUANG, SUANLUANG BANGKOK 10250
TEL.0-2717-3000-29 FAX.0-2719-9484

Certificate of Calibration

Cert.No.: 25CH1433
Page.: 1 of 3

Equipment : pH Meter
Manufacturer : Horiba
Model : LAQUA-PH210
Serial No. : HA0A0005
ID No. : UAE.EFM.004/2563(EFM.pH.04/63)
Condition As-Received: Used Item
Received Date : 09 December 2025
Calibration Date : 11 December 2025
Reference : 2512-0243WSC-2
Submitted by : United Analyst and Engineering Consultant Co.,Ltd.
3 Soi Udomsuk 41, Sukhumvit Road, Bangchak, Phrakhanong, Bangkok 10260

Ambient Temperature : (25 ± 2.5) °C
Relative Humidity : (50 ± 15) %
Calibration Procedure : In - house method :
- CP-CH5 by direct measurement with DC voltage standard and direct measurement with certified reference material (CRM)
- CP-CH8 by comparison with temperature standard

Calibrated by : Warakorn Lerngagtrakul

Approved by :
Approved Signatory

(✓) Chakrit Waewwanjua
( ) Ponpan Paipim
( ) Saithip Meangmai

Issue Date : 12 December 2025

The Uncertainties are for a confidence probability of approximately 95%

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Condition of this calibration result

1. Reference Standard Instrument

Instrument	Serial No.	ID No.	Cert. No.	Due Date
1) Document Process Calibrator	54030049	130RC116	25E2743	25 Aug 2026
2) Ref. Standard Thermometer	4982054	110RC044	25I708	03 July 2026

- This measurement result is traceable to SI throught Technology Promotion Association (Thailand - Japan)

2. Certified Reference Materials :The measurement results are traceable to SI through Hach Lenge GmbH Ltd., Deutsche Akkreditierungsstelle, Accredited No.D-RM-15184-01-00
:The measurement results are traceable to SI through CPA chem Ltd., ANSI-ASQ National Accreditation Board, Accredited No. AR-1835

Buffer Solution	Manufacturer	Lot No.	Exp. date
pH 4.007	CPA chem	1114384	12 June 2027
pH 6.999	Hach Lenge GmbH	C03273	13 May 2027
pH 10.010	CPA chem	1114385	08 June 2026

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

Calibration Results

Function : mV Measurement

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

Unit Under Calibration	Nominal Value	Standard Voltage Input	Actual Reading		Uncertainty of Measurement (±mV)	Coverage factor *k*
	pH	mV	mV	pH		
pH Meter	4.00	177.48	177.4	4.01	0.058	2.00
S/N.: HA0A0005	7.00	0.00	0.1	7.00	0.058	2.00
	7.00	0.00	0.1	7.00	0.058	2.00
	10.00	-177.48	-177.2	10.01	0.058	2.00

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Calibration Results

Function : pH Measurement

Performing three buffers standard curve by using buffer nominal pH (4,7)(7,10)

Unit Under Calibration	Standard pH Buffer Solution	Actual pH Reading	Actual mV Reading (mV)	Uncertainty of pH Measurement (±)	Coverage factor *k*
pH Electrode	4.007	4.01	175.4	0.0085	2.05
S/N.: -	6.999	7.00	-0.3	0.0095	2.00
	6.999	7.01	-0.5	0.0096	2.00
	10.010	10.01	-170.6	0.0092	2.00

Function : Temperature Measurement

(*) Without adjustment

This equipment was connected with Temperature Probe;

- Model : -
- Serial No. : -

Dimension of probe

- Length : 112 mm.
- Diameter : 16 mm.
- Immersion Depth : 100 mm.

Calibration Point (°C)	Standard Temperature (°C)	UUC* Reading (°C)	Error (°C)	Uncertainty of measurement (± °C)	Coverage factor *k*
15.0	15.002	15.0	-0.002	0.13	2.00
30.0	30.002	30.0	-0.002	0.13	2.00
45.0	45.003	45.0	-0.003	0.13	2.00

Remark - UUC* = Unit Under Calibration

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

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DQE Services Co.,Ltd.
32 Soi Ladprao-Wanghin 55, Ladprao-Wanghin Rd., Ladprao, Ladprao, Bangkok 10230
Phone : +66 (0)2 538 2054, Email : dqeservicesinfo@gmail.com

CERTIFICATE OF CALIBRATION

Certificate No. : SP25-021 Page 1 of 5

Customer : United Analyst and Engineering Consultant Co.,Ltd. (Head Office)

Address : 3 Soi Udomsuk 41, Sukhumvit Road, Bangchak, Phrakhanong, Bangkok 10260

Location of calibration : Instrument room (207)

Equipment : UV-Vis Spectrophotometer

Manufacturer : HITACHI

Model : U-2900

Serial No. : 21E22-009

ID No. : UAE.WAT.051/2564

Received Date : 26 May 2025

Calibration Date : 26 May 2025

Issue Date : 29 May 2025

Condition Instrument : Good

Calibrated by : (Mr.Tanawut Rittidach) Technical Manager

Approved by : (Ms.Chonticha Sangngern) Quality Manager

The calibration result is applied only to the above calibrated item and was found accurate as shown on date and place of calibration only.

The measurement capability of the laboratory and its traceability to recognized national standards and to the unit 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 DQE Services Co., Ltd.

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DQE Services Co.,Ltd.
32 Soi Ladprao-Wanghin 55, Ladprao-Wanghin Rd., Ladprao, Ladprao, Bangkok 10230
Phone : +66 (0)2 538 2054, Email : dqeservicesinfo@gmail.com

REPORT OF CALIBRATION

Certificate No. : SP25-021 Page 2 of 5

Environment Condition : Ambient Temperature 25 ± 5 °C

Relative humidity 55 ± 20 %RH

Calibration method : In-house method CP-01 Based on ASTM E275-08

Certified Reference Materials :

Material	Serial No.	Certificate No.	Due date
Absobance Standard set	25760	115663	25 October 2025
Absobance Standard set	25757	115638	25 October 2025
Wavelength Standard set	25806	115657	25 October 2025
Wavelength Standard set	25758	115665	25 October 2025

Traceability : This certification is traceable to the International System of Unit maintained at National - Institute of Standards and Technology (NIST) through Starna Scientific Limited

Spectral Band Width of UUC : 1.5 nm.

Scan Speed of UUC : 200 nm/min

Scan Interval of UUC : 0.1 nm.

Resolution of UUC : Photometric 0.001 Abs.

Wavelength 0.1 nm.

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DQE Services Co.,Ltd.
32 Soi Ladprao-Wanghin 55, Ladprao-Wanghin Rd., Ladprao, Ladprao, Bangkok 10230
Phone : +66 (0)2 538 2054, Email : dqeservicesinfo@gmail.com

REPORT OF CALIBRATION

Certificate No. : SP25-021

Calibration Results : Without adjustment

Photometric Accuracy :

Wavelength (nm.)	CRMs Values (Abs)	UUC Reading (Abs)	Correction (Abs)	Uncertainty (Abs)	Coverage factor k
420	0.0000	0.000	0.0000	0.0028	2.00
	0.5780	0.574	0.0040	0.0031	2.00
	1.0484	1.043	0.0054	0.0029	2.00
	2.1876	2.185	0.0026	0.0075	2.00
440	0.0000	0.000	0.0000	0.0028	2.00
	0.5595	0.558	0.0015	0.0034	2.00
	1.0239	1.022	0.0019	0.0035	2.00
	2.1230	2.121	0.0020	0.0079	2.00
465	0.0000	0.000	0.0000	0.0028	2.00
	0.5230	0.519	0.0040	0.0030	2.00
	0.9633	0.960	0.0033	0.0029	2.00
	1.9753	1.973	0.0023	0.0070	2.00
546.1	0.0000	0.000	0.0000	0.0028	2.00
	0.5181	0.516	0.0021	0.0031	2.00
	1.0002	0.998	0.0022	0.0033	2.00
	1.9973	1.995	0.0023	0.0084	2.00
590	0.0000	0.000	0.0000	0.0028	2.00
	0.5517	0.550	0.0017	0.0030	2.00
	1.0803	1.080	0.0003	0.0030	2.00
	2.0373	2.036	0.0013	0.0079	2.00
635	0.0000	0.000	0.0000	0.0028	2.00
	0.5591	0.558	0.0011	0.0031	2.00
	1.0518	1.051	0.0008	0.0030	2.00
	1.9274	1.926	0.0014	[illegible]	[illegible]

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DQE Services Co.,Ltd.
32 Soi Ladprao-Wanghin 55, Ladprao-Wanghin Rd., Ladprao, Ladprao, Bangkok 10230
Phone : +66 (0)2 538 2054, Email : dqeservicesinfo@gmail.com

REPORT OF CALIBRATION

Certificate No. : SP25-021

Photometric Accuracy :

Wavelength (nm.)	CRMs Values (Abs)	UUC Reading (Abs)	Correction (Abs)	Uncertainty (Abs)	Coverage factor k
235	0.0000	0.000	0.0000	0.0050	2.00
	0.7469	0.748	-0.0011	0.0057	2.00
257	0.0000	0.000	0.0000	0.0050	2.00
	0.8674	0.866	0.0014	0.0059	2.00
313	0.0000	0.000	0.0000	0.0050	2.00
	0.2919	0.291	0.0009	0.0051	2.00
350	0.0000	0.000	0.0000	0.0050	2.00
	0.6430	0.640	0.0030	0.0055	2.00

เอกสารไม่ควบคุม

FM-708-02 R01 1/11/2021

DQE Services Co.,Ltd.
32 Soi Ladprao-Wanghin 55, Ladprao-Wanghin Rd., Ladprao, Ladprao, Bangkok 10230
Phone : +66 (0)2 538 2054, Email : dqeservicesinfo@gmail.com

REPORT OF CALIBRATION

Certificate No. : SP25-021

Wavelength Accuracy :

CRMs Values (nm.)	UUC Reading (nm.)	Correction (nm.)	Uncertainty (nm.)	Coverage factor k
241.72	241.0	0.72	0.18	2.00
279.45	278.8	0.65	0.18	2.00
287.81	287.2	0.61	0.18	2.00
334.06	333.6	0.46	0.18	2.00
360.93	360.6	0.33	0.18	2.00
418.59	418.2	0.39	0.18	2.00
445.94	445.6	0.34	0.18	2.00
460.02	459.8	0.22	0.18	2.00
536.59	536.6	-0.01	0.18	2.00
637.98	638.0	-0.02	0.18	2.00
431.38	431.2	0.18	0.18	2.00
472.50	472.4	0.10	0.18	2.00
513.47	513.4	0.07	0.18	2.00
528.88	528.8	0.08	0.18	2.00
573.17	573.2	-0.03	0.18	2.00
585.35	585.0	0.35	0.20	2.00
684.40	684.4	0.00	0.18	2.00
740.72	741.0	-0.28	0.20	2.00
748.55	748.8	-0.25	0.18	2.00
807.03	807.2	-0.17	0.18	2.00
879.28	879.6	-0.32	0.18	2.00

Remark : - UUC = Unit Under Calibration

- N/A = Not Avaiable

- The result expanded uncertainty of measurement U is stated as the standard uncertainty of measurement multiplied by the coverage factor k, which for a normal distribution corresponds to a coverage probability of approximately 95%

- End of Certificate -

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FM-708-02 R01 1/11/2021

TECHNOLOGY PROMOTION ASSOCIATION (THAILAND-JAPAN)
CORPORATE SERVICES 3: EQUIPMENT CALIBRATION AND TESTING SERVICES
534/4 PATTANAKARN ROAD SOI 18, SUANLUANG, SUANLUANG BANGKOK 10250
TEL.0-2717-3000-29 FAX.0-2719-9484

Certificate of Calibration

Cert.No.: 25CH1053
Page.: 1 of 2

Equipment :	Turbidity Meter
Manufacturer :	Oakton
Model :	T100IR
Serial No. :	1120501017
ID. No. :	UAE.WAT.056/2563
Condition As-Received:	Used Item
Received Date :	05 September 2025
Calibration Date :	08 September 2025
Reference :	2509-0212DSC-1
Submitted by :	United Analyst and Engineering Consultant Co.,Ltd. 3 Soi Udomsuk 41, Sukhumvit Road, Bangchak, Phrakhanong, Bangkok 10260
Ambient Temperature :	(23 ± 3.0) °C
Relative Humidity :	(50 ± 20) %
Calibration Procedure :	In - house method : CP-CH11 Direct measurement by using Formazin standard solution
Calibrated by :	Walalak Sirithean
Approved by :	Saithip Approved Signatory
	( ) Chakrit Waewwanjua ( ) Ponpan Paipim (✓) Saithip Meangmai
Issue Date :	9 September 2025

The Uncertainties are for a confidence probability of approximately 95%

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

เอกสารไม่ควบคุม

Condition of this calibration result

1. Reference Standard Instruments :

Instruments	ID No.	Certificate No.	Due date
1) Data Logger	130EC012	24H2043	23 Sep 2025
2) Liquid-in Glass Thermometer	130RC003	25I440	16 Apr 2026

- This measurement result is traceable to SI through Technology Promotion Association (Thailand - Japan)

2. Certified Reference Materials : Turbidity Standard solution (Formzin)
   - The measurement results are traceable to SI through CPA chem Ltd.,

Turbidity Solution	Manufacturer	Lot No.	Exp. date
20.0 NTU	CPA Chem	1088008	18 Mar 2026
100.0 NTU	CPA Chem	1088007	18 Mar 2026
400 NTU	CPA Chem	1088018	18 Mar 2026
800 NTU	CPA Chem	1088017	18 Mar 2026

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

Calibration result

Performing five - Formazin suspension standard curve by using 0, 20, 100, 400, 800 NTU
Tubidity Meter serial number : 1120501017

Standard Formazine suspension (NTU)	UUC* Reading (NTU)	Uncertainty of Measurement (± NTU)	Coverage Factor *k*
0	0.00	0.026	2.00
20.0	20.2	0.20	2.00
100.0	100	1.2	2.00
400	403	2.4	2.00
800	799	4.3	2.00

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

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

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List of Instrument Certificates for Environmental Quality Analysis

No.	Instrument/Equipment	Parameter	Manufacturer	Model/Serial No.	Calibrator	Certification No.	Date of Calibration	Due date of Calibration*
1	Analytical Balance	FAT OIL AND GREASE	Mettler Toledo	AB204-S/FACT / 1129361010	United Analyst and Engineering Consultant Co., Ltd.	260318-1-BL007-26	3/4/2026	2/4/2027
2	Analytical Balance	TOTAL DISSOLVED SOLIDS	Mettler Toledo	XSR205DU / C210685394	United Analyst and Engineering Consultant.Co.,Ltd (UAE)	260311-2-BL001-26	12/3/2026	11/3/2027
3	Analytical Balance	TOTAL SUSPENDED SOLIDS	Mettler Toledo	XSR205DU / C009071872	United Analyst and Engineering Consultant. Co., Ltd. (UAE)	260311-2-BL002-26	12/3/2026	11/3/2027
4	DO Meter	BIOCHEMICAL OXYGEN DEMAND	YSI	5100 / 11B 101863	Technology Promotion Association (Thailand-Japan)	26TW50	2/3/2026	1/3/2027
5	Cooled Incubator	TOTAL COLIFORM BACTERIA	Binder	KB400 / WTB20200000015535	National Food Institute, Ministry of Industry, Thailand	2602303-006-01	11/3/2026	10/3/2027
6	UV-VIS Spectrophotometer	NITRATE NITROGEN PHOSPHATE PHOSPHORUS	Hitachi	U-2900 / 21E22-009	DQE Services Co.,Ltd.	SP25-021	26/5/2025	25/5/2026

Due Date of Calibration* : Based on the annual calibration plan. At least 1 time per year.

United Analyst and Engineering Consultant Co., Ltd.
3 Soi Udomsuk 41, Sukhumvit Road, Bangchak, Phrakhanong, Bangkok 10260
Tel.0 2763 2828 Fax 0 2763 2800 www.uaeconsultant.com E-mail: uae@uaeconsultant.com

Certificate of Calibration

Certificate No.: 260318-1-BL007-26
Code No.: BL007-26
Page: 1 of 3

Customer Name: United Analyst and Engineering Consultant Co., Ltd.
Address: 3 Soi Udom suk 41, Sukhumvit Rd., Bang Chak, Phar Khanong, Bangkok 10260

Equipment: Electronic Balance
Manufacturer: Mettler Toledo
Model: AB204-S/FACT
Serial No.: 1129361010
Asset No. : UAE.WAS.002/2552
Building : UAE No.3 Floor : 1 Room : 107

Received Date: April 2, 2026
Date of Calibation : April 3, 2026
Calibration Conditions: Temperature start 21.9 °C end 22.1 °C
Humidity start 60.6 % end 60.1 %
Pressure start 756.6 mmHg end 755.1 mmHg

Calibrated by: Thanachat Chatpahol

Approved by: Suwit Chotnok Signature:

Issued Date: April 7, 2026

Note : 1) The Uncertainties are for a confidence probability of approximately 95%
2) This Certificate is valid only to the item calibrated on date and place of calibration.
3) 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 United Analyst and Engineering Consultant Co.,Ltd. (UAE)

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United Analyst and Engineering Consultant Co., Ltd.
3 Soi Udomsuk 41, Sukhumvit Road, Bangchak, Phrakhanong, Bangkok 10260
Tel.0 2763 2828 Fax 0 2763 2800 www.uaeconsultant.com E-mail: uae@uaeconsultant.com

Equipment: Electronic Balance
Manufacturer: Mettler Toledo
Model: AB204-S/FACT
Readability: 0.0001 g
Serial No.: 1129361010
ID No.: UAE.WAS.002/2552
Max. Capacity: 220 g
Calibration Date: April 3, 2026
Condition As-Received: In Condition

Condition of Equipment:
Condition of This Result of Calibration:
1. Calibration Method: This instrument was calibrated by method UAE.CP.CAL.006 In-House Method based on UKAS Lab 14 : 2022
2. Reference Standrads:

Reference Standard:	Model	Serial No.	Calibrated By	Certificate No.	Traceability	Due Date
Standard Weight Class E2 (OIML)	1 mg to 1 kg	C510641605	METTLER TOLEDO GmbH	C510641605	Mettler-Toledo	3-Mar-27

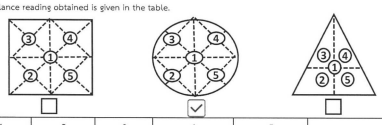
Instrument	Model	Serial No.	Calibrated By	Certificate No.	Traceability	Due Date
Thermo-Hygro-Baro Meter	MHB-382SD	AK.46457	SUCCESS	SG-H-00992/68	Success Gateway	26-Nov-26
Thermo-Hygro-Baro Meter	MHB-382SD	AK.46457	TPA	25P4464	TPA	18-Dec-26

3. This certification is traceable to SI Unit
4. This certification was certified only for the instrument we calibrated
5. This result of calibration wae found accurate as show on date and place of calibration only.
6. Through the reference standard laboratory of Mettler-Toledo GmbH C510641605, SAS accreditation number SCS 0032

Calibraton Result:
1. Repeatability of Reading:

Nominal Value (g)	Standard Deviation of Reading (g)
200*	0.00010

2. Eccentric or off-center loading
A mass of 100 g was placed and moved to various position on pan
The Balance reading obtained is given in the table.



1 (g)	2 (g)	3 (g)	4 (g)	5 (g)	Maximum Difference (g)
100.0025	100.0022	100.0022	100.0029	100.0030	0.0005

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3 Soi Udomsuk 41, Sukhumvit Road, Bangchak, Phrakhanong, Bangkok 10260
Tel.0 2763 2828 Fax 0 2763 2800 www.uaeconsultant.com E-mail: uae@uaeconsultant.com

Equipment: Electronic Balance
Manufacturer: Mettler Toledo
Model: AB204-S/FACT
Readability: 0.0001 g
Serial No.: 1129361010
ID No.: UAE.WAS.002/2552
Max. Capacity: 220 g
Calibration Date: April 3, 2026

Calibraton Result: (Continued)
Calibraton Range: 0 - 200 g
Calibraton Adjustment: Internal Calibration

3. Error of indication from nominal or conventional mass value:

Nominal Value (g)	Reference Value (g)	Indication (g)	Correction (g)	Uncertainty (± mg)	Coverage Factor k
Unload	0.0000000	0.0000	0.0000	0.17	2.37
0.01	0.0100005	0.0099	0.0001	0.17	2.32
0.05	0.0500003	0.0499	0.0001	0.17	2.32
0.1	0.1000083	0.0999	0.0001	0.17	2.32
0.5	0.5000121	0.5000	0.0000	0.17	2.32
1.0	1.0000119	1.0000	0.0000	0.17	2.32
10.0	10.000033	10.0003	-0.0003	0.17	2.32
40.0	40.000054	40.0010	-0.0010	0.18	2.23
50.0	50.000037	50.0013	-0.0012	0.18	2.23
80.0	80.000098	80.0020	-0.0019	0.19	2.11
100.0	100.000042	100.0025	-0.0024	0.20	2.10
120.0	120.000068	120.0028	-0.0027	0.22	2.06
150.0	150.000079	150.0035	-0.0035	0.24	2.04
160.0	160.000112	160.0036	-0.0035	0.25	2.03
200.0	200.000146	200.0049	-0.0047	0.28	2.00

4. Effect of Tare test:

Tare Load (g)	Test Load (g)	Indication (g)	Correction (g)
100	20.000028	20.0004	-0.0003
	40.000054	40.0009	-0.0008
	60.000070	60.0013	-0.0012
	80.000098	80.0017	-0.0016
	100.000042	100.0021	-0.0021

Remark: -
The report uncertainty of measurement was based on standard uncertainty multiplied by coverage factor k, providing a level of confidence of approximetely 95%

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United Analyst and Engineering Consultant Co., Ltd.
3 Soi Udomsuk 41, Sukhumvit Road, Bangchak, Phrakhanong, Bangkok 10260
Tel.0 2763 2828 Fax 0 2763 2800 www.uaeconsultant.com E-mail: uae@uaeconsultant.com

Certificate of Calibration

Certificate No.: 260311-2-BL001-26
Code No.: BL001-26
Page: 1 of 4

Customer Name: United Analyst and Engineering Consultant Co., Ltd.
Address: 3 Soi Udom suk 41, Sukhumvit Rd., Bang Chak, Phar Khanong, Bangkok 10260

Equipment: Electronic Balance
Manufacturer: Mettler Toledo
Model: XSR205DU
Serial No.: C210685394
Asset No. : UAE.WAO.010/2565
Building : UAE number 3 Floor : 2 Room : 208

Received Date: March 11, 2026
Date of Calibation : March 12, 2026
Calibration Conditions: Temperature 23.0 °C to 23.6 °C
Humidity 51.5 % to 54.4 %
Pressure 755.7 mmHg to 757.9 mmHg

Calibrated by: Thanachat Chatpahol

Approved by: Suwit Chotnok Signature:

Issued Date: March 16, 2026

Note : 1) The Uncertainties are for a confidence probability of approximately 95%
2) This Certificate is valid only to the item calibrated on date and place of calibration.
3) 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 United Analyst and Engineering Consultant Co.,Ltd. (UAE)

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United Analyst and Engineering Consultant Co., Ltd.
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Tel.0 2763 2828 Fax 0 2763 2800 www.uaeconsultant.com E-mail: uae@uaeconsultant.com

Equipment: Electronic Balance
Model: XSR205DU
Serial No.: C210685394
Max. Capacity: 81 g / 220 g
Calibration Date: March 12, 2026
Manufacturer: Mettler Toledo
Readability: 0 to 81 (g): 0.01 mg , > 80 to 200 (g) : 0.1 mg
ID No.: UAE.WAO.010/2565
Condition As-Received: In Condition

Condition of Equipment:

Condition of This Result of Calibration:

1. Calibration Method: This instrument was calibrated by method UAE.CP.CAL.006 In-House Method based on UKAS Lab 14 : 2022
2. Reference Standrads:

Reference Standard:	Model	Serial No.	Calibrated By	Certificate No.	Traceability	Due Date
Standard Weight Class E2 (OIML)	1 mg to 1 kg	C510641605	METTLER TOLEDO GmbH	C510641605	METTLER TOLEDO GmbH	3-Mar-27
Standard Weight Class E2 (OIML)	1 mg to 1 kg	B749109122	AMARC	25-009359	AMARC	21-Jan-27

Instrument	Model	Serial No.	Calibrated By	Certificate No.	Traceability	Due Date
Thermo-Hygro-Baro Meter	MHB-382SD	AK.46457	SUCCESS	SG-H-00992/68	Success Gateway	26-Nov-26
Thermo-Hygro-Baro Meter	MHB-382SD	AK.46457	TPA	25P4464	TPA	18-Dec-26

3. This certification is traceable to SI Unit
4. This certification was certified only for the indtrument we calibrated
5. This result of calibration wae found accurate as show on date and place of calibration only.
6. Through the reference standard laboratory of Mettler-Toledo GmbH C510641605, SAS accreditation number SCS 0032
7. Through the reference standard laboratory of AMARC 25-009359, TISI accreditation number 0152

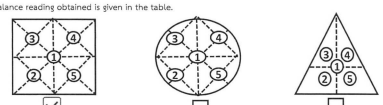
Calibraton Result:

1. Repeatability of Reading:

Nominal Value (g)	Standard Deviation of Reading (g)
80	0.000019
200*	0.000055

2. Eccentric or off-center loading

A mass of 100 g was placed and moved to various position on pan
The Balance reading obtained is given in the table.



1 (g)	2 (g)	3 (g)	4 (g)	5 (g)	Maximum Difference (g)
100.0002	100.0002	100.0003	100.0004	100.0003	0.0001

เอกสารไม่ควบคุม

United Analyst and Engineering Consultant Co., Ltd.
3 Soi Udomsuk 41, Sukhumvit Road, Bangchak, Phrakhanong, Bangkok 10260
Tel.0 2763 2828 Fax 0 2763 2800 www.uaeconsultant.com E-mail: uae@uaeconsultant.com

Equipment: Electronic Balance
Model: XSR205DU
Serial No.: C210685394
Max. Capacity: 81 g / 220 g
Calibration Date: March 12, 2026
Manufacturer: Mettler Toledo
Readability: 0 to 81 (g): 0.01 mg , > 80 to 200 (g) : 0.1 mg
ID No.: UAE.WAO.010/2565

Calibraton Result: (Continued)
Calibraton Range: 0 to 80 (g)
Calibraton Adjustment: Internal Calibration

3. Error of indication from nominal or conventional mass value: (Range: 0 to 81 (g) ; Resolution: 0.00001 g)

Nominal Value (g)	Reference Value (g)	Indication (g)	Correction (g)	Uncertainty (± mg)	Coverage Factor k
Unload	0.0000000	0.00000	0.00000	0.032	2.65
0.001	0.0010020	0.00101	0.00000	0.032	2.65
0.005	0.0050025	0.00501	-0.00001	0.032	2.65
0.01	0.0100005	0.01001	-0.00001	0.032	2.65
0.05	0.0500003	0.05001	-0.00001	0.032	2.65
0.10	0.1000083	0.10000	0.00001	0.033	2.65
0.50	0.5000121	0.50001	0.00000	0.033	2.65
1	1.0000119	1.00003	-0.00002	0.032	2.52
2	2.0000125	2.00003	-0.00002	0.033	2.52
5	5.0000146	5.00003	-0.00002	0.033	2.32
10	10.0000330	10.00006	-0.00003	0.034	2.21
20	20.000028	20.00006	-0.00003	0.041	2.07
30	30.000061	30.00017	-0.00011	0.055	2.00
40	40.000054	40.00021	-0.00016	0.066	2.00
50	50.000037	50.00023	-0.00019	0.068	2.00
60	60.000070	60.00029	-0.00022	0.084	2.00
80	80.000098	80.00039	-0.00030	0.12	2.00

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Tel.0 2763 2828 Fax 0 2763 2800 www.uaeconsultant.com E-mail: uae@uaeconsultant.com

Equipment: Electronic Balance
Model: XSR205DU
Serial No.: C210685394
Max. Capacity: 81 g / 220 g
Calibration Date: March 12, 2026
Manufacturer: Mettler Toledo
Readability: 0 to 81 (g): 0.01 mg , > 80 to 200 (g) : 0.1 mg
ID No.: UAE.WAO.010/2565

Calibraton Result: (Continued)
Calibraton Range: > 81 to 200 (g)
Calibraton Adjustment: Internal Calibration

3. Error of indication from nominal or conventional mass value: (Range: > 81 - 220 (g) ; Resolution: 0.0001 g)

Nominal Value (g)	Reference Value (g)	Indication (g)	Correction (g)	Uncertainty (± mg)	Coverage Factor k
Unload	0.0000000	0.0000	0.0000	0.032	2.65
90	90.0000910	90.0004	-0.0003	0.16	2.00
100	100.0000420	100.0003	-0.0003	0.16	2.00
110	110.0000750	110.0004	-0.0003	0.18	2.00
120	120.0000680	120.0004	-0.0003	0.19	2.00
130	130.0001010	130.0005	-0.0004	0.20	2.00
140	140.0000960	140.0004	-0.0003	0.21	2.00
150	150.0000790	150.0005	-0.0004	0.22	2.00
160	160.0001120	160.0004	-0.0003	0.23	2.00
170	170.0001050	170.0003	-0.0002	0.24	2.00
200	200.0001460	200.0001	0.0000	0.26	2.00

4. Effect of Tare test:

Tare Load (g)	Test Load (g)	Indication (g)	Correction (g)
100	20.000028	20.0001	0.0000
	40.000054	40.0001	0.0000
	60.000070	60.0000	0.0001
	80.000098	80.0000	0.0001
	100.000109	100.0000	0.0001

Remark: -
The report uncertainty of measurment was based on standard uncertainty multiplied by coverage factor k, providing a level of confidence of approximetely 95%

o---o-End-o---o

เอกสารไม่ควบคุม

United Analyst and Engineering Consultant Co., Ltd.
3 Soi Udomsuk 41, Sukhumvit Road, Bangchak, Phrakhanong, Bangkok 10260
Tel.0 2763 2828 Fax 0 2763 2800 www.uaeconsultant.com E-mail: uae@uaeconsultant.com

Certificate of Calibration

Certificate No.: 260311-2-BL002-26
Code No.: BL002-26
Page: 1 of 4

Customer Name: United Analyst and Engineering Consultant Co., Ltd.
Address: 3 Soi Udom suk 41, Sukhumvit Rd., Bang Chak, Phar Khanong, Bangkok 10260

Equipment: Electronic Balance
Manufacturer: Mettler Toledo
Model: XSR205DU
Serial No.: C009071872
Asset No. : UAE.WAO.012/2563
Building : UAE number 3 Floor : 2 Room : 208

Received Date: March 11, 2026
Date of Calibation : March 12, 2026
Calibration Conditions: Temperature 23.8 °C to 24.1 °C
Humidity 50.0 % to 59.0 %
Pressure 755.5 mmHg to 755.6 mmHg

Calibrated by: Thanachat Chatpahol
Approved by: Suwit Chotnok Signature:

Issued Date: March 16, 2026

Note : 1) The Uncertainties are for a confidence probability of approximately 95%
2) This Certificate is valid only to the item calibrated on date and place of calibration.
3) 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 United Analyst and Engineering Consultant Co.,Ltd. (UAE)

เอกสารไม่ควบคุม

United Analyst and Engineering Consultant Co., Ltd.
3 Soi Udomsuk 41, Sukhumvit Road, Bangchak, Phrakhanong, Bangkok 10260
Tel.0 2763 2828 Fax 0 2763 2800 www.uaeconsultant.com E-mail: uae@uaeconsultant.com

Equipment: Electronic Balance
Model: XSR205DU
Serial No.: C009071872
Max. Capacity: 81 g / 220 g
Calibration Date: March 12, 2026
Condition As-Received: In Condition

Manufacturer: Mettler Toledo
Readability: 0 to 81 (g): 0.01 mg > 80 to 200 (g) : 01 mg
ID No.: UAE.WAO.012/2563

Condition of Equipment:

Condition of This Result of Calibration:

1. Calibration Method: This instrument was calibrated by method UAE.CP.CAL.006 In-House Method based on UKAS Lab 14 : 2022
2. Reference Standrads:

Reference Standard:	Model	Serial No.	Calibrated By	Certificate No.	Traceability	Due Date
Standard Weight Class E2 (OIML)	1 mg to 1 kg	C510641605	METTLER TOLEDO GmbH	C510641605	Mettler-Toledo GmbH	3-Mar-27
Standard Weight Class E2 (OIML)	1 mg to 1 kg	B749109122	AMARC	25-009359	Mettler-Toledo	21-Jan-27

Instrument	Model	Serial No.	Calibrated By	Certificate No.	Traceability	Due Date
Thermo-Hygro-Baro Meter	MHB-382SD	AK.46457	SUCCESS	SG-H-00992/68	Success Gateway	26-Nov-26
Thermo-Hygro-Baro Meter	MHB-382SD	AK.46457	TPA	25P4464	TPA	18-Dec-26

3. This certification is traceable to SI Unit
4. This certification was certified only for the indtrument we calibrated
5. This result of calibration wae found accurate as show on date and place of calibration only.
6. Through the reference standard laboratory of Mettler-Toledo GmbH C510641605, SAS accreditation number SCS 0032
7. Through the reference standard laboratory of AMARC 25-009359, TISI accreditation number 0152

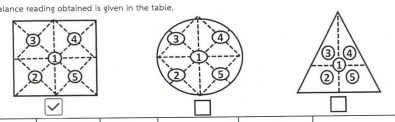
Calibraton Result:

1. Repeatability of Reading:

Nominal Value (g)	Standard Deviation of Reading (g)
80	0.000008
200*	0.000045

2. Eccentric or off-center loading

A mass of 100 g was placed and moved to various position on pan
The Balance reading obtained is given in the table.



1 (g)	2 (g)	3 (g)	4 (g)	5 (g)	Maximum Difference (g)
100.0000	100.0000	100.0000	100.0000	100.0000	0.0000

เอกสารไม่ควบคุม

Equipment: Electronic Balance
Model: XSR205DU
Serial No.: C009071872
Max. Capacity: 81 g / 220 g
Calibration Date: March 12, 2026

Manufacturer: Mettler Toledo
Readability: 0 to 81 (g): 0.01 mg > 80 to 200 (g) : 01 mg
ID No.: UAE.WAO.012/2563

Calibraton Result: (Continued)
Calibraton Range: 0 to 80 (g)
Calibraton Adjustment: Internal Calibration

3. Error of indication from nominal or conventional mass value: (Range: 0 to 81 (g) ; Resolution: 0.00001 g)

Nominal Value (g)	Reference Value (g)	Indication (g)	Correction (g)	Uncertainty (± mg)	Coverage Factor k
Unload	0.0000000	0.0000	0.0000	0.015	2.25
0.001	0.0010020	0.0010	0.00000	0.015	2.23
0.005	0.0050025	0.0050	-0.00002	0.015	2.23
0.01	0.0100005	0.0100	-0.00002	0.015	2.23
0.05	0.0500003	0.0500	-0.00001	0.015	2.21
0.10	0.1000083	0.1000	-0.00001	0.015	2.20
0.50	0.5000121	0.5000	-0.00002	0.016	2.15
1	1.0000119	1.0000	0.00000	0.016	2.12
2	2.0000125	2.0000	-0.00001	0.017	2.09
5	5.0000146	5.0000	-0.00002	0.020	2.05
10	10.0000330	10.0001	-0.00002	0.023	2.00
20	20.000028	20.0001	-0.00005	0.033	2.00
30	30.000061	30.0001	-0.00004	0.051	2.00
40	40.000054	40.0001	-0.00004	0.063	2.00
50	50.000037	50.0001	-0.00005	0.064	2.00
60	60.000070	60.0001	-0.00004	0.081	2.00
80	80.000098	80.0001	-0.00001	0.11	2.00

เอกสารไม่ควบคุม

United Analyst and Engineering Consultant Co., Ltd.
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Tel.0 2763 2828 Fax 0 2763 2800 www.uaeconsultant.com E-mail: uae@uaeconsultant.com

Equipment: Electronic Balance
Model: XSR205DU
Serial No.: C009071872
Max. Capacity: 81 g / 220 g
Calibration Date: March 12, 2026

Manufacturer: Mettler Toledo
Readability: 0 to 81 (g): 0.01 mg > 80 to 200 (g) : 01 mg
ID No.: UAE.WAO.012/2563

Calibraton Result: (Continued)
Calibraton Range: > 80 to 200 (g)
Calibraton Adjustment: Internal Calibration

3. Error of indication from nominal or conventional mass value: (Range: > 80 to 200 (g) ; Resolution: 0.0001 g)

Nominal Value (g)	Reference Value (g)	Indication (g)	Correction (g)	Uncertainty (± mg)	Coverage Factor k
Unload	0.0000000	0.0000	0.0000	0.02	2.25
90	90.0000910	90.0000	0.0000	0.16	2.00
100	100.0000420	100.0000	0.0000	0.16	2.00
110	110.0000750	110.0000	0.0000	0.17	2.00
120	120.0000680	120.0000	0.0001	0.18	2.00
130	130.0001010	130.0000	0.0000	0.20	2.00
140	140.0000960	140.0003	0.0001	0.21	2.00
150	150.0000790	150.0003	0.0001	0.21	2.00
160	160.0001120	160.0003	0.0001	0.23	2.00
170	170.0001050	170.0003	-0.0002	0.24	2.00
200	200.0001460	200.0004	-0.0002	0.26	2.00

4. Effect of Tare test:

Tare Load (g)	Test Load (g)	Indication (g)	Correction (g)
100	20.000028	20.0000	0.0000
	40.000054	40.0002	-0.0001
	60.000070	60.0002	-0.0001
	80.000098	80.0002	-0.0001
	100.000042	100.0003	-0.0002

Remark:
The report uncertainty of measurment was based on standard uncertainty multiplied by coverage factor k, providing a level of confidence of approximetely 95%

o---o-End-o---o

เอกสารไม่ควบคุม

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

Certificate of Testing

Cert.No.: 26TW50
Page.: 1 of 2

Equipment : DO Meter
Manufacturer : YSI
Model : 5100
Serial No. : 11B 101863
ID No. : UAE.WAO.004/2554
Received Date : 27 February 2026
Test Date : 02 March 2026
Reference : 2602-0915DSC-1
Submitted by : United Analyst and Engineering Consultant Co.,Ltd.
3 Soi Udomsuk 41, Sukhumvit Road, Bangchak,
Phrakhanong, Bangkok 10260
Laboratory Condition : Temperature (25 ± 5) °C
Humidity (50 ± 20) %
Test Procedure : In - house method : CP-CH9
by Comparison Technique with Azide Modification Method
Tested by : Walalak Sirithean
Approved by : Saithip
Approved Signatory

( ) Chakrit Waewwanjua
( ) Ponpan Paipim
(✓) Saithip Meangmai

Issue Date : 03 March 2026

เอกสารไม่ควบคุม

Condition of this result of calibration

1. Reference Standard Instruments :
   This measurement result is traceable to the International System of Unit through the reference standards laboratory of Industrial Calibration Center, Technology Promotion Association (Thailand-Japan).

Instruments	ID No.	Certificate No.	Due Date
1. Burette	130BU10	25CG1126	18 Mar 2027
2. Balance	110RC001	25MM316	02 July 2026

2. Standard Material :-

Material	Manufacturer	Lot.No.	Assay
Sodium Thiosulfate 5-Hydrate AR	KEMAUS	2203162447	99.6%

Result : **Dissolved Oxygen Meter Adjustment With Air 100 %**
Dissolved Oxygen Probe No.: 24F100202

Titration Method (Azide Modification Method) (mg/L)	DO Meter Reading (mg/L)	Standard Deviation (mg/L)
8.20	8.20	0.0084

This report was certified only for the instrument we tested.It is allowable to use for study Intend to use for advertising and referral purpose is prohibited.This report may not be reproduced other in full, without written approval of the laboratory

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เอกสารไม่ควบคุม

nfi national food institute ministry of industry
อุตสาหกรรมพัฒนานวัตกรรมเพื่อสถาบันอาหาร
ศูนย์บริการห้องปฏิบัติการอุตสาหกรรมอาหาร
Foundation for Industrial Development National Food Institute
Food Industrial Laboratory Service Center

ilac-MRA
NSC-TISI-TIS 17025 CALIBRATION 0061

Calibration Certificate

Certificate No.: 2602303-006-01
Page : 1 of 2

Equipment:	CHAMBER (Incubator)		
Manufacturer:	BINDER	**Customer Name:**	UNITED ANALYST AND ENGINEERING CONSULTANT CO.,LTD.
Model:	KB 400	**Address:**	3 Soi Udomsuk 41, Sukhumvit Road, Bangchack, Prakhanong, Bangkok 10260
Serial No.:	20200000015535		
ID No.:	UAE.MIC.018/2564		
Order No.:	2602303		
Operation No.:	2602303-006		
Date of Receipt:	11 March 2026		
Date of Calibration:	11 March 2026		

Metrological traceability:

1. Calibration Method:
   - This instrument was calibrated by inserting 9 standard thermometers into its chamber, in accordance with W-TE-014. based on TLAS G-20-1/02-08 (E): Guidelines for Calibration and Checks of Temperature Controlled Enclosures.
   - The temperature scale used in this laboratory is the International Temperature Scale of 1990 (ITS-90).
   - All data shown below are final values, and the initial data may be obtained upon request.
2. Reference Standard Instrument:

Instrument	Model/Type	Serial No./ID No.	Certificate No.	Due Date	Through
Digital Thermometer with sensor	DAQ973A RTD	MY59008964 CH#201-209/ RTD#201-209	2502244-001-01	29 March 2026	NATIONAL FOOD INSTITUTE

3. This certificate is traceable to the International System of Units (SI).
4. This certificate is valid only for the instrument that was calibrated.
5. The result of this calibration was found to be accurate only on the date and at the place of calibration shown.

Calibrated by	Mr.Nuttapol Niyomchat Specialist	**Approved by**	(Mr.Pheraphat Tuanjit) Manager, Division of Calibration Laboratory Responsible for the Technical Management Team
Date of Issue:	19 March 2026		

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.

เอกสารไม่ควบคุม

2008 ซอยอรุณอมรินทร์ 36 ถนนอรุณอมรินทร์ แขวงบางยี่ขัน เขตบางพลัด กรุงเทพมหานคร
2008 Soi 36, Arun Amarin Road, Bang Yi Khan Subdistrict, Bang Phlat District, Bangkok 10700, Thailand
Tel: +66(0) 2422 8688 Fax: +66(0) 2422 8545
nfi.or.th

nfi national food institute ministry of industry
อุตสาหกรรมพัฒนานวัตกรรมเพื่อสถาบันอาหาร
ศูนย์บริการห้องปฏิบัติการอุตสาหกรรมอาหาร
Foundation for Industrial Development National Food Institute
Food Industrial Laboratory Service Center

ilac-MRA
NSC-TISI-TIS 17025 CALIBRATION 0061

Calibration Certificate

Certificate No.: 2602303-006-01
Page : 2 of 2

Calibration Condition:

Equipment:	CHAMBER (Incubator)	**Place of Calibration:**	Microbiology Laboratory
UUC* Resolution:	0.1 °C		UNITED ANALYST AND ENGINEERING CONSULTANT CO.,LTD
Condition of the item:	Normal & Good	**Environment Conditions:**	Ambient Temperature (17.2 ± 1) °C
	Without adjustment / As Found		Relative Humidity (51.5 ± 4) %
	- Time of record 1 hour 9 minute / point		Line Voltage (229 ± 2) V.

Calibration Results:

Table1 : Reporting of Temperature

Calibration Point (°C)	Measured Temperature (°C) @ Sensor No. (Sensor No.9 is REF) Std.#1	Std.#2	Std.#3	Std.#4	Std.#5	Std.#6	Std.#7	Std.#8	Std.#9	Measurement Uncertainty (±°C)
35.0	34.78	34.86	34.81	34.83	35.22	35.21	35.22	35.12	34.83	0.28

Table 2 : Reporting of Characterization Results

UUC* Setting (°C)	UUC* Reading (°C) Max	Min	Average	Stability ± (°C)	Uniformity (°C)	Overall Variation (°C)
35.0	35.0	35.0	35.0	0.034	0.39	0.52

Note

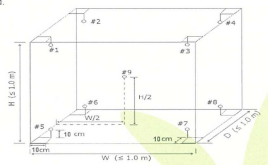
- UUC* : Unit Under Calibration
- The quoted uncertainty includes contributions from 'Stability' and 'Loading Effect (20% of Temperature Uniformity).
- Stability = One-half of the greatest maximum difference of measured temperatures at any one sensors, for at least half an hour after reaching steady 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 througout observation time.

For more information, details of the sensor installation should be reported.

Fresh air Damper	- Open	-	Position
	X Close	100%	Fan speed
	- Not Available		

Dimension of inside chamber and sensor installation location (cm)

W x H x D	65	x	125	x	48	
a x b x c	10	x	10	x	10	



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 of Report --------

เอกสารไม่ควบคุม

2008 ซอยอรุณอมรินทร์ 36 ถนนอรุณอมรินทร์ แขวงบางยี่ขัน เขตบางพลัด กรุงเทพมหานคร
2008 Soi 36, Arun Amarin Road, Bang Yi Khan Subdistrict, Bang Phlat District, Bangkok 10700, Thailand
Tel: +66(0) 2422 8688 Fax: +66(0) 2422 8545
nfi.or.th

DQE Services
DQE Services Co.,Ltd.
32 Soi Ladprao-Wanghin 55, Ladprao-Wanghin Rd., Ladprao, Ladprao, Bangkok 10230
Phone : +66 (0)2 538 2054, Email : dqeservicesinfo@gmail.com

NSC-TISI-TIS 17025 CALIBRATION 0404

CERTIFICATE OF CALIBRATION

Certificate No. : SP25-021 Page 1 of 5

Customer : United Analyst and Engineering Consultant Co.,Ltd. (Head Office)

Address : 3 Soi Udomsuk 41, Sukhumvit Road, Bangchak, Phrakhanong, Bangkok 10260

Location of calibration : Instrument room (207)

Equipment : UV-Vis Spectrophotometer

Manufacturer : HITACHI

Model : U-2900

Serial No. : 21E22-009

ID No. : UAE.WAT.051/2564

Received Date : 26 May 2025

Calibration Date : 26 May 2025

Issue Date : 29 May 2025

Condition Instrument : Good

Calibrated by :	(Mr.Tanawut Rittidach) Technical Manager	**Approved by :**	(Ms.Chonticha Sangngern) Quality Manager

The calibration result is applied only to the above calibrated item and was found accurate as shown on date and place of calibration only.

The measurement capability of the laboratory and its traceability to recognized national standards and to the unit 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 DQE Services Co., Ltd.

เอกสารไม่ควบคุม

DQE Services Co.,Ltd.
32 Soi Ladprao-Wanghin 55, Ladprao-Wanghin Rd., Ladprao, Ladprao, Bangkok 10230
Phone : +66 (0)2 538 2054, Email : dqeservicesinfo@gmail.com

NSC-TISI-TIS 17025 CALIBRATION 0404

REPORT OF CALIBRATION

Certificate No. : SP25-021

Environment Condition : Ambient Temperature 25 ± 5 °C

Relative humidity 55 ± 20 %RH

Calibration method : In-house method CP-01 Based on ASTM E275-08

Certified Reference Materials :

Material	Serial No.	Certificate No.	Due date
Absobance Standard set	25760	115663	25 October 2025
Absobance Standard set	25757	115638	25 October 2025
Wavelength Standard set	25806	115657	25 October 2025
Wavelength Standard set	25758	115665	25 October 2025

Traceability : This certification is traceable to the International System of Unit maintained at National - Institute of Standards and Technology (NIST) through Starna Scientific Limited

Spectral Band Width of UUC : 1.5 nm.

Scan Speed of UUC : 200 nm/min

Scan Interval of UUC : 0.1 nm.

Resolution of UUC : Photometric 0.001 Abs.

Wavelength 0.1 nm.

เอกสารไม่ควบคุม

DQE Services Co.,Ltd.
32 Soi Ladprao-Wanghin 55, Ladprao-Wanghin Rd., Ladprao, Ladprao, Bangkok 10230
Phone : +66 (0)2 538 2054, Email : dqeservicesinfo@gmail.com

NSC-TISI-TIS 17025 CALIBRATION 0404

REPORT OF CALIBRATION

Certificate No. : SP25-021

Calibration Results : Without adjustment

Photometric Accuracy :

Wavelength (nm.)	CRMs Values (Abs)	UUC Reading (Abs)	Correction (Abs)	Uncertainty (Abs)	Coverage factor k
420	0.0000	0.000	0.0000	0.0028	2.00
	0.5780	0.574	0.0040	0.0031	2.00
	1.0484	1.043	0.0054	0.0029	2.00
	2.1876	2.185	0.0026	0.0075	2.00
440	0.0000	0.000	0.0000	0.0028	2.00
	0.5595	0.558	0.0015	0.0034	2.00
	1.0239	1.022	0.0019	0.0035	2.00
	2.1230	2.121	0.0020	0.0079	2.00
465	0.0000	0.000	0.0000	0.0028	2.00
	0.5230	0.519	0.0040	0.0030	2.00
	0.9633	0.960	0.0033	0.0029	2.00
	1.9753	1.973	0.0023	0.0070	2.00
546.1	0.0000	0.000	0.0000	0.0028	2.00
	0.5181	0.516	0.0021	0.0031	2.00
	1.0002	0.998	0.0022	0.0033	2.00
	1.9973	1.995	0.0023	0.0084	2.00
590	0.0000	0.000	0.0000	0.0028	2.00
	0.5517	0.550	0.0017	0.0030	2.00
	1.0803	1.080	0.0003	0.0030	2.00
	2.0373	2.036	0.0013	0.0079	2.00
635	0.0000	0.000	0.0000	0.0028	2.00
	0.5591	0.558	0.0011	0.0031	2.00
	1.0518	1.051	0.0008	0.0030	2.00
	1.9274	1.926	0.0014	[illegible]	2.00

เอกสารไม่ควบคุม

DQE Services Co.,Ltd.
32 Soi Ladprao-Wanghin 55, Ladprao-Wanghin Rd., Ladprao, Ladprao, Bangkok 10230
Phone : +66 (0)2 538 2054, Email : dqeservicesinfo@gmail.com

NSC-TISI-TIS 17025 CALIBRATION 0404

REPORT OF CALIBRATION

Certificate No. : SP25-021

Photometric Accuracy :

Wavelength (nm.)	CRMs Values (Abs)	UUC Reading (Abs)	Correction (Abs)	Uncertainty (Abs)	Coverage factor k
235	0.0000	0.000	0.0000	0.0050	2.00
	0.7469	0.748	-0.0011	0.0057	2.00
257	0.0000	0.000	0.0000	0.0050	2.00
	0.8674	0.866	0.0014	0.0059	2.00
313	0.0000	0.000	0.0000	0.0050	2.00
	0.2919	0.291	0.0009	0.0051	2.00
350	0.0000	0.000	0.0000	0.0050	2.00
	0.6430	0.640	0.0030	0.0055	2.00

เอกสารไม่ควบคุม

DQE Services Co.,Ltd.
32 Soi Ladprao-Wanghin 55, Ladprao-Wanghin Rd., Ladprao, Ladprao, Bangkok 10230
Phone : +66 (0)2 538 2054, Email : dqeservicesinfo@gmail.com

NSC-TISI-TIS 17025 CALIBRATION 0404

REPORT OF CALIBRATION

Certificate No. : SP25-021

Wavelength Accuracy :

CRMs Values (nm.)	UUC Reading (nm.)	Correction (nm.)	Uncertainty (nm.)	Coverage factor k
241.72	241.0	0.72	0.18	2.00
279.45	278.8	0.65	0.18	2.00
287.81	287.2	0.61	0.18	2.00
334.06	333.6	0.46	0.18	2.00
360.93	360.6	0.33	0.18	2.00
418.59	418.2	0.39	0.18	2.00
445.94	445.6	0.34	0.18	2.00
460.02	459.8	0.22	0.18	2.00
536.59	536.6	-0.01	0.18	2.00
637.98	638.0	-0.02	0.18	2.00
431.38	431.2	0.18	0.18	2.00
472.50	472.4	0.10	0.18	2.00
513.47	513.4	0.07	0.18	2.00
528.88	528.8	0.08	0.18	2.00
573.17	573.2	-0.03	0.18	2.00
585.35	585.0	0.35	0.20	2.00
684.40	684.4	0.00	0.18	2.00
740.72	741.0	-0.28	0.20	2.00
748.55	748.8	-0.25	0.18	2.00
807.03	807.2	-0.17	0.18	2.00
879.28	879.6	-0.32	0.18	2.00

Remark : - UUC = Unit Under Calinration

- N/A = Not Avaiable

- The result expanded uncertainty of measurement U is stated as the standard uncertainty of measurement multiplied by the coverage factor k, which for a normal distribution corresponds to a coverage probability of approximately 95%

- End of Certificate -

เอกสารไม่ควบคุม

เอกสารแนบ 4-4

เอกสารสอบเทียบเครื่องมือตรวจวิเคราะห์คุณภาพน้ำใต้ดิน

CALIBRATION LABORATORY CO., LTD.
2/10-11,14,55 Soi Prasert Manukit 29 Yaek 4, Prasert Manukit Rd., Ladphrao, Bangkok 10230
Tel. 02-578-0353-4 Fax: 02-578-2672 www.cal-laboratory.com E-mail:sale@cal-laboratory.com

CERTIFICATE OF CALIBRATION

FOR

NOMENCLATURE	:	pH METER
MANUFACTURER	:	HANNA
MODEL / TYPE	:	HI3512/HI1332/HI7662-T
SERIAL NO.	:	08685754/11250B7M/092806BN[PH04/56]
CLID. NO.	:	272501562
JOB CONTROL NO.	:	250617070523
CALIBRATION SERVICE	:	☑ IN-LABORATORY ☐ ON-SITE

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

DATE OF RECEIVED : 17 June 2025 DATE OF ISSUED : 20 June 2025

The report of calibration shall not be reproduced except in full without approval of the Calibration Laboratory Co., Ltd.

Calibrated By : Sukgasem Seehanart
Wenick Inchaisri
Calibration Engineer

Approved By : Mongkol Yotsoontorn
Authorized Signatory
20 June 2025

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

CALIBRATION LABORATORY CO., LTD.
2/10-11,14,55 Soi Prasert Manukit 29 Yaek 4, Prasert Manukit Rd., Ladphrao, Bangkok 10230
Tel. 02-578-0353-4 Fax: 02-578-2672 www.cal-laboratory.com E-mail:sale@cal-laboratory.com

REPORT OF CALIBRATION

FOR

NOMENCLATURE	:	pH METER
MANUFACTURER	:	HANNA
MODEL / TYPE	:	HI3512/HI1332/HI7662-T
SERIAL NO.	:	08685754/11250B7M/092806BN[PH04/56]
DATE OF CALIBRATION	:	18 June 2025

ENVIRONMENT CONDITIONS :

Temperature : (25 ± 2.5) °C Relative Humidity : (50 ± 15) % RH

PROCEDURE USED :

This instrument was calibrated under procedure No. **CLC-CPCH-01** [pH Meter]. The calibration was performed by direct measurement with Certified Reference Material (CRM).

This instrument was calibrated under procedure No. **CLC-CPTH-04** [Temperature] based on **ASTM E 644-04** as calibration guidelines. The calibration was performed by using Calibration Bath, Precision Thermometer and IPRT which maintained by the Calibration Laboratory Co., Ltd.

REFERENCE STANDARD USED :

1. pH Standard Solution, NIMT TRM CODE TRM-S-2003, TRM CODE TRM-S-2007.
2. pH Standard Solution, Control Company Catalog Number 06664260,11754256, Lot Number CC787362.
3. Calibration Bath, Kambic Model OB-22/2 ULT S/N. 17115653.
4. Precision Thermometer, ASL Model F250 S/N. 1334023800.
5. IPRT, Wika Model CTP5000-250-D S/N. PO00043543-1-10-1.

CALIBRATION LABORATORY CO., LTD.
2/10-11,14,55 Soi Prasert Manukit 29 Yaek 4, Prasert Manukit Rd., Ladphrao, Bangkok 10230
Tel. 02-578-0353-4 Fax: 02-578-2672 www.cal-laboratory.com E-mail:sale@cal-laboratory.com

TRACEABILITY :

1. The measurements are traceable to International System of Units (SI) , through National Institute of Metrology (Thailand). Lot Number. 080124 , 120124. Due Date 23 January 2026.
2. The measurements are traceable to International System of Units (SI) , through Control Company. Certificate No. 4281-14495731 , Due Date 27 September 2025.
3. The measurements are traceable to International System of Units (SI) , through Calibration Laboratory Co., Ltd. Certificate No. Q24120999, Due Date 26 November 2025.
4. The measurements are traceable to International System of Units (SI) , through Thailand Institute of Scientific and Technological Research (TISTR). Certificate No. PSL-T 1042/67, Due Date 16 October 2025.
5. The measurements are traceable to International System of Units (SI) , through National Institute of Metrology (Thailand). Certificate No. TT-0146-24, Due Date 28 October 2025.

UNCERTAINTY :

The reported expanded uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor complies with the table which for a normal distribution corresponds to a coverage probability of approximately 95 %. It has been evaluated according to the "Evaluation of the Uncertainty of Measurement in Calibration (EA-4/02 M:2022)"

CALIBRATION LABORATORY CO., LTD.
2/10-11,14,55 Soi Prasert Manukit 29 Yaek 4, Prasert Manukit Rd., Ladphrao, Bangkok 10230
Tel. 02-578-0353-4 Fax: 02-578-2672 www.cal-laboratory.com E-mail:sale@cal-laboratory.com

CONDITION OF CALIBRATION ITEM : RECEIVED IN GOOD OPERATIONAL CONDITION

MEASUREMENT RESULTS : (X) without adjustment ( ) adjustment

The table in the following gives the calibration results and associated measurement uncertainties of pH meter.

CALIBRATION DATA

1. pH METER RESULT @ 25 °C

Standard pH Buffer Solution (pH)	pH Meter Reading (pH)	pH Meter Reading (mV)	Correction (pH)	Uncertainty of pH Measurement (± pH)	*k* Factor
4.003	4.005	168.2	-0.002	0.010	2,00
7.005	7.010	-8.1	-0.005	0.013	2,00
10.015	10.010	-177.7	+0.005	0.014	2,00

Technical Note. Setting function CAL 3 point (4,7,10).

Note. The Scope of Accredited ANAB Certificate No. ACDM-2814 Version 015 Page 4 of 68

2. TEMPERATURE RESULT

Immersion depth (mm)	Actual Temperature (°C)	DUC Reading (°C)	Correction (°C)	Uncertainty ± (°C)
100	25.00	25.0	0.00	0.07

Technical Note. Type of sensor : Thermistor

Probe ∅ 3 mm

Materials : Metal Sheath.

The reported uncertainty is based on a standard uncertainty multiplied by coverage factor of $k = 2,00$.

Note. The Scope of Accredited ANAB Certificate No. ACDM-2814 Version 015 Page 56 of 68

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

End of Certificate

TECHNOLOGY PROMOTION ASSOCIATION (THAILAND-JAPAN)
CORPORATE SERVICES 3: EQUIPMENT CALIBRATION AND TESTING SERVICES
534/4 PATTANAKARN ROAD SOI 18, SUANLUANG, SUANLUANG BANGKOK 10250
TEL.0-2717-3000-29 FAX.0-2719-9484

Certificate of Calibration

Cert.No.: 26CH202
Page.: 1 of 2

Equipment :	Turbidity Meter
Manufacturer :	Eutech
Model :	CyberScan WLTB1000
Serial No. :	201802206
ID. No. :	TB 02/50
Condition As-Received:	Used Item
Received Date :	09 February 2026
Calibration Date :	16 February 2026
Reference :	2602-0291WN-1
Submitted by :	S.P.S. Consulting Service Co.,Ltd. 7 Phaholyothin 24, Phaholyothin Road., Jompol, Chatuchak, Bangkok 10900
Ambient Temperature :	(23 ± 3.0) °C
Relative Humidity :	(50 ± 20) %
Calibration Procedure :	In - house method : CP-CH11 Direct measurement by using Formazin standard solution
Calibrated by :	Walalak Sirithean
Approved by :	Approved Signatory

(✓) Chakrit Waewwanjua
( ) Ponpan Paipim
( ) Saithip Meangmai

Issue Date : 22 February 2026

The Uncertainties are for a confidence probability of approximately 95%

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

Condition of this calibration result

1. Reference Standard Instruments :

Instruments	ID No.	Certificate No.	Due date
1) Liquid-in Glass Thermometer	130RC114	25I972	10 Sep 2026

- This measurement result is traceable to SI through Technology Promotion Association (Thailand - Japan)

2. Certified Reference Materials : Turbidity Standard solution (Formzin)
- The measurement results are traceable to SI through CPA chem Ltd.,

Turbidity Solution	Manufacturer	Lot No.	Exp. date
20.0 NTU	CPA Chem	1135349	16 Aug 2026
40.0 NTU	CPA Chem	1135350	16 Aug 2026
100.0 NTU	CPA Chem	1135352	16 Aug 2026
400 NTU	CPA Chem	1135360	16 Aug 2026

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

Calibration result

Performing three - Formazin suspension standard curve by using 0, 10, 1000 NTU
Tubidity Meter serial number : 201802206

Standard Formazine suspension (NTU)	UUC* Reading (NTU)	Uncertainty of Measurement (± NTU)	Coverage Factor *k*
20.0	19.8	0.20	2.00
40.0	40.5	0.28	2.00
100.0	101	1.2	2.00
400	392	2.3	2.00

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

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

-o0o-

CALIBRATION LABORATORY CO., LTD.
2/10-11,14,55 Soi Prasert Manukit 29 Yaek 4, Prasert Manukit Road, Ladphrao, Bangkok 10230
Tel. 02-578-0353-4 Fax. 02-578-2672 www.cal-laboratory.com E-mail: sale@cal-laboratory.com

CERTIFICATE OF CALIBRATION

FOR

NOMENCLATURE	:	CONDUCTIVITY METER
MANUFACTURER	:	METTLER TOLEDO
MODEL / TYPE	:	SEVEN COMPACT S230
SERIAL NO.	:	C141708983/5821320179[CD 05/65]
CLID. NO.	:	272300452
JOB CONTROL NO.	:	260202014122
CALIBRATION SERVICE	:	☑ IN-LABORATORY ☐ ON-SITE

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

DATE OF RECEIVED : 02 February 2026 DATE OF ISSUED : 04 February 2026

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

Calibrated By : Sukgasem Seehanart
Wenick Inchaisri
Calibration Engineer

Approved By : Mongkol Yotsoontorn
Authorized Signatory
04 February 2026

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

Certificate No. Q26014122
F3-011-05/12-23

CALIBRATION LABORATORY CO., LTD.
2/10-11,14,55 Soi Prasert Manukit 29 Yaek 4, Prasert Manukit Road, Ladphrao, Bangkok 10230
Tel. 02-578-0353-4 Fax. 02-578-2672 www.cal-laboratory.com E-mail: sale@cal-laboratory.com

REPORT OF CALIBRATION

FOR

NOMENCLATURE	:	CONDUCTIVITY METER
MANUFACTURER	:	METTLER TOLEDO
MODEL / TYPE	:	SEVEN COMPACT S230
SERIAL NO.	:	C141708983/5821320179[CD 05/65]
DATE OF CALIBRATION	:	03 February 2026

ENVIRONMENT CONDITIONS :

Temperature : (25 ± 2.5) °C Relative Humidity : (50 ± 15) % RH

PROCEDURE USED :

This instrument [Conductivity Meter] was calibrated under procedure No. **WI-305-130.**

The calibration was performed by direct measurement with Certified Reference Material (CRM) and Reference Material (RM) .

This instrument [Temperature] was calibrated by comparison with Temperature Bath, Precision Thermometer and IPRT which maintained by the Calibration Laboratory Co., Ltd.

REFERENCE STANDARD USED :

1. Conductivity Standard , Hanna Product Code HI7033L Lot Number 0101.
2. Potassium Chloride Solution, Sigma-Aldrich Canada Co Product No. 1.01203.0500.
3. Potassium Chloride Solution, Sigma-Aldrich Canada Co Product No. 1.01254.0500.
4. Temperature Bath, Jingmi Model RTS-35S S/N. 16339.
5. Precision Thermometer, ASL Model F200-A-8 S/N. 014433/03.
6. IPRT, ASL Model T100-250-1D S/N. PO106346-1-13.

Certificate No. Q26014122
F3-011-05/12-23

TRACEABILITY :

1. The measurements are traceable to International System of Units (SI) , through Hanna instruments.
Certificate No. 07D45, Due Date April 2027.
2. The measurements are traceable to International System of Units (SI) , through Sigma-Aldrich Canada Co.
Lot Number. HC56384703, Due Date 31 January 2028.
3. The measurements are traceable to International System of Units (SI) , through Sigma-Aldrich Canada Co.
Lot Number. HC33528554, Due Date 30 November 2026.
4. The measurements are traceable to International System of Units (SI) , through Calibration Laboratory Co., Ltd.
Certificate No. Q25097314, Due Date 29 August 2026.
5. The measurements are traceable to International System of Units (SI) , through Thailand Institute of Scientific and Technological Research (TISTR). Certificate No. PSL-T 0177/68, Due Date 10 February 2026.
6. The measurements are traceable to International System of Units (SI) , through National Institute of Metrology (Thailand).
Certificate No. TT-1008-25, Due Date 04 March 2026.

UNCERTAINTY :

The reported expanded uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor complies with the table which for a normal distribution corresponds to a coverage probability of approximately 95 %.
It has been evaluated according to the "Evaluation of the Uncertainty of Measurement in Calibration (EA-4/02 M:2022)"

CALIBRATION LABORATORY CO., LTD.
2/10-11,14,55 Soi Prasert Manukit 29 Yaek 4, Prasert Manukit Road, Ladphrao, Bangkok 10230
Tel. 02-578-0353-4 Fax. 02-578-2672 www.cal-laboratory.com E-mail: sale@cal-laboratory.com
NSC-TISI-TIS 17025 CALIBRATION 0859 CLC

CONDITION OF CALIBRATION ITEM : RECEIVED IN GOOD OPERATIONAL CONDITION

MEASUREMENT RESULTS : (X) without adjustment ( ) adjustment

The table in the following gives the calibration results and associated measurement uncertainties of Conductivity Meter.

CALIBRATION DATA

1. Conductivity Solution Test @ 25°C

Standard Conductivity Solution	DUC Reading	Uncertainty of Measurement	*k* Factor
*84 µS/cm	83.95 µS/cm [Cell Constant 0.470]	± 1.15 µS/cm	2,00
1414 µS/cm	1414 µS/cm [Cell Constant 0.510]	± 21 µS/cm	2,00
12.83 mS/cm	12.83 mS/cm [Cell Constant 0.570]	± 0.19 mS/cm	2,00

Note. The Scope of Accredited TISI Certificate No. 23-LB0092 Issue 02 Page 91 of 138

* means Calibrations marked "Not TISI Accredited" in this Certificate have been included for completeness.

***2. TEMPERATURE RESULT**

Immersion depth (mm)	Actual Temperature (°C)	DUC Reading (°C)	Correction (°C)	Uncertainty ±(°C)
100	25.00	25.1	-0.10	0.08

Technical Note. Type of sensor : Conductivity Probe

Probe Ø 12 mm

The reported uncertainty is based on a standard uncertainty multiplied by coverage factor of *k* = 2.

Note. * means Calibrations marked "Not TISI Accredited" in this Certificate have been included for completeness.

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

End of Certificate

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

CERTIFICATE No : 26M2268
REFERENCE No : 80204-3
PAGE : 1 OF 2

Certificate of Calibration

EQUIPMENT	:	DIGITAL BALANCE
MANUFACTURER	:	SARTORIUS
MODEL	:	BSA224S-CW
SERIAL No	:	36591843
ID No	:	BA 09/61
CONDITION AS RECEIVED	:	USED ITEM
SUBMITTED BY	:	S.P.S. CONSULTING SERVICE CO., LTD. 7 SOI PHAHOLYOTHIN 24, PHAHOLYOTHIN RD., JOMPOL, CHATUCHAK, BANGKOK 10900
CALIBRATED BY	:	SUCHAT S.
CALIBRATION DATE	:	05-Mar-26
APPROVED BY	:	PONGSAK J.
ISSUED DATE	:	06-Mar-26
RECEIVED DATE	:	05-Mar-26

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

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

CERTIFICATE No : 26M2268
PAGE : 2 OF 2

Calibration Report

EQUIPMENT	:	DIGITAL BALANCE	**MODEL**	:	BSA224S-CW
MANUFACTURER	:	SARTORIUS	**S/N**	:	36591843
ID No	:	BA 09/61	**RECEIVED DATE**	:	05-Mar-26
AIR PRESSURE	:	1004mbar ± 1mbar	**CALIBRATION DATE**	:	05-Mar-26
AMBIENT TEMPERATURE	:	25° C ± 1° C	**RELATIVE HUMIDITY**	:	50 %RH ± 10 % RH

CONDITION OF THIS RESULTS OF CALIBRATION

1. THIS INSTRUMENT WAS CALIBRATED BY ACCORDING TO UKAS LAB 14 EDITION 6:2019 BY USING KNOWN WEIGHT STANDARD WEIGHT. THE BALANCE WAS NOT ADJUSTED BEFORE CALIBRATION. THE BALANCE HAS NO ZERO TRACKING FUNCTION. REPEATABILITY WAS MEASURED BY USING 10 REPEATED MEASUREMENTS. LINEARITY WAS MEASURED COVERING 10 POINTS, EVENLY SPREAD OVER THE RANGE. THE INSTRUMENT WAS SET ZERO BEFORE PERFORMING THE LINEARLITY TEST. OFF-CENTER LOADING WAS MEASURED BY USING STANDARD WEIGHTS PLACED ON THE PAN AND MOVED TO VARIOUS POSITIONS ON THE PAN.
2. REFERENCE STANDARD INSTRUMENTS :-

INSTRUMENT	MODEL	SERIAL No	CERTIFICATE No	DUE DATE
1) STANDARD WEIGHT SET	E2	QK-I-151	C02250116	28-Jan-27
2) STANDARD WEIGHT	E2	15843	C02250117	29-Jan-27

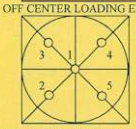
3. THE CERTIFICATE IS VALID FOR THE ITEM CALIBRATED AS SHOWN ON THE DATE AND PLACE OF CALIBRATION ONLY.
4. THIS RESULT EXCLUDE LONG TERM STABILITY OF THE UNIT UNDER CALIBRATION.
5. THIS CERTIFICATE IS TRACEABLE TO THE INTERNATIONAL SYSTEM OF UNIT MAINTAINED AT:-
- NATIONAL INSTITUTE OF METROLOGY (THAILAND)

RESULT OF CALIBRATION :- WITHOUT ADJUSTMENT

1. ZERO SETTING FUNCTION : NORMAL
2. TARE FUNCTION : NORMAL
3. REPEATABILITY OF READING AT 200 g WAS 0.000055 g
4. DEPARTURE FROM NOMINAL VALUE/ LINEARITY

NOMINAL VALUE (g)	BALANCE READING (g)	CORRECTION (g)	UNCERTAINTY (± g)
0.0	0.0000	0.0000	0.00010
0.1	0.1000	0.0000	0.00011
0.2	0.2000	0.0000	0.00010
0.5	0.5000	0.0000	0.00011
1.0	1.0000	0.0000	0.00011
2.0	2.0000	0.0000	0.00011
5.0	5.0000	0.0000	0.00011
10.0	10.0000	0.0000	0.00011
20.0	20.0001	-0.0001	0.00011
50.0	50.0000	0.0000	0.00013
100.0	100.0001	-0.0001	0.00019
200.0	200.0001	-0.0001	0.00032

5. OFF CENTER LOADING ERROR



POINT	READING (g)
1	100.0000
2	100.0000
3	100.0000
4	100.0000
5	100.0000
OFF-CENTER LOADING	0.0000

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

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

Cert. No. : SP25026
Pages : 1 of 4

Calibration Certificate

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

Calibrated by : Nitinun Srihawan

Approved by : Wichok B.
(Wichok Ekpongpradit)

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

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

Calibration Method :

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

Condition of this result of calibration :

1. Certified reference materials

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

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

Result of calibration : Wavelength Accuracy

(Without adjustment)

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

UUC* = Unit Under Calibration

Wichok B.

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Result of calibration : Photometric Accuracy

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

UUC* = Unit Under Calibration

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

Result of calibration : Photometric Accuracy

(Without adjustment)

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

UUC* = Unit Under Calibration

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

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

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

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

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

End of Calibration Certificate

PinAAcle 900T Preventive Maintenance (PM)

Company Name:	S.P.S Consulting Service Co.,Ltd		
Address (Instrument Location):	Phaholyothin 24, Phaholyothin Rd, Ladyac, Jatujak, Bangkok 10900		
Serial Number:	PTCS1411103	**PM Number:**	2/2
Customer Name (if applicable):	K.Phenpha	**Telephone Number:**	WO-11540402
Customer Support Engineer Name:	Prasit	**Service Order Number:**	083-9269252
Date PM Performed: (DD-MMM-YYYY)	18 DEC 2025	**Next PM Due Date:** (DD-MMM-YYYY)	18 JUN 2026
Standard Labor Hours to Complete PM :		**5 hours**	

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

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

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

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Component List

Component / Specific Model	Serial #	Configuration Notes
PinAAcle900T	PTCS1411103	WinLab32 Ver 7.4.1.0730

Parts Lists

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

Additional Reagents and Standards Required for PM				
Part Number (if applicable)	**Description**	**Quality**	**Batch/Lot #**	**Expired Date** (MM/YY)
N9300183	1000 mg/L Copper Standard	AR	27-156CUY1	SEP-2026
N9300244	GFAAS Mixed Standard	AR		

Additional Reagents and Standards Required for PM (Customer Support Solution)				
Part Number (if applicable)	**Description**	**Quantity**	**Batch/Lot #**	**Expiration Date** (MM/YY)
N/A	DI Water	250 ml.	AR	AR
N/A	0.5% HNO_3	250 ml.	AR	AR

Additional Tools Required for PM			
Part Number (if applicable)	**Description**	**Quantity**	**Serial #**
N1013000	0.2A Neutral density filter	1	MG0-704
N1013002	1.0A Neutral density filter	1	MG2-891
B3100652 Or N9307029	Electronic Flow Meter	1	
B0505495	Test Jig	1	
03030997	System 2 EDL Driver	1	030309-97E
N3050605	As System 2 EDL	1	17986
N3050121	Cu Lumina HCL	1	000003793D12
N3050109	Ba Lumina HCL	1	041123-010120
N3050139	K Lumina HCL	1	0000037B8E1D
N3050152	Ni Lumina HCL	1	
N3050119	Cr Lumina HCL	1	010324-0300050

Procedure Checklist

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

1. **General:**
   - ☑ Review the instrument performance with the customer and document any recent problems.
   - ☑ Inspect the customer log book and make any appropriate PM entries.
   - ☑ Perform general inspection of system for cleanliness.
2. **PC Instrument Software:**
   - ☑ Instrument Software user files/databases archived, packed, and/or deleted as needed.
3. **Mechanical:**
   - ☑ Inspect and clean all fans and filters. Replace filters if necessary
   - ☑ Inspect all gas and water lines for leaks and/or wear. Replace if needed. Thoroughly inspect all quick connects. Replace the Y connector, P/N 09921079, if needed.
   - ☑ Clean exterior of the instrument.

   3.1 Flame Technique
   - ☑ Inspect the burner head, burner chamber, and nebulizer. Clean if needed as stated in the Hardware Guide.
   - ☑ Check burner head dimensions with the feeler gauge as stated in the Hardware Guide in the Maintenance chapter section on cleaning the burner head and checking sloth width. Replace if out of specification
   - ☑ Check the condition of the end cap, burner head, and nebulizer O-rings. Replace if necessary.
   - ☑ Check the drain system for signs of wear. Replace worn or damaged parts.
   - ☑ Visually check for proper flame conditions when igniting the Air-C2H2 and N20-C2H2 flames (if applicable).

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

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

4. Electrical:

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

5. Optics:

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

6. Gasses:

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

7. Flame Interlock Check:

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

Parameter	Specification	Test Results	Pass/Fail
Flame Sensor	Air/C_2H_2 Flame correctly shuts down	Active	Passed
Drain Sensor	Air/C_2H_2 Flame correctly shuts down	Active	Passed
Nebulizer Sensor	Air/C_2H_2 Flame correctly shuts down	Active	Passed
C_2H_2 Pressure Sensor	Air/C_2H_2 Flame correctly shuts down	Active	Passed
Air Pressure Sensor	Air/C_2H_2 Flame correctly shuts down	Active	Passed
Burner Head Sensor	Choosing Nitrous Oxide as the oxidant should trigger an interlock shuts down	Active	Passed

8. After PM Performance tests [Flame]:

8.1 Detector Linearity with Barium

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

Parameter	Specification	Certificate Value at 553.6 nm (Abs.)	Test Results	Pass/Fail
1.0 A ND Filter	± 5% from Cert.	0.9874	0.9644	Passed
0.2 A ND Filter	± 5% from Cert.	0.1886	0.1727	Passed

8.2 Baseline Noise at 1.0 Absorbance with Barium

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

Parameter	Specification	Results	Pass/Fail
Standard Deviation	≤ 0.010	0.0016	Passed

8.3 AA Baseline Noise with Copper

Description: Check baseline noise.

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

8.4 D_2 Background Compensation with Copper

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

Parameter	Specification	Results	Pass/Fail
Standard Deviation	≤ 0.010	0.0069	Not Applicab

8.5 AA-BG Baseline Noise with Copper

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

Parameter	Specification	Results	Pass/Fail
Standard Deviation	≤ 0.005	0.0005	Not Applicab

8.6 AA-BG Baseline Noise with Arsenic

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

Parameter	Specification	Results	Pass/Fail
Standard Deviation	≤ 0.005	0.0013	Not Applicab

8.7 Flame Sensitivity

Description: Instrument Sensitivity checked against Copper standard.

Standard Copper Sensitivity	Specification	Results (Abs.)	Pass/Fail
5 mg/L Sensitivity SS Neb (if applicable)	> 0.250 Abs.	N/A	Not Applicable
2 mg/L Sensitivity HS Neb (if applicable)	> 0.250 Abs.	0.3544	Passed

9. After PM Performance tests [THGA]:

9.1 Furnace Gas Flows

Description: Ensures the flow rates are within specification.

Parameter	Specification	Test Results	Pass/Fail
Internal Flow Rate	250 mL/min ± 25 mL/min	252	Passed
External Flow Rate	100 mL/min ± 10 mL/min	97	Passed

9.2 Chromium Baseline Noise

Description: Signal to noise check.

Parameter	Specification	Results	Pass/Fail
Baseline Noise	≤ 0.005 Abs.	-0.0010	Passed
Standard Deviation	≤ 0.005	0.0009	Passed

9.3 Chromium Characteristic Mass and Precision

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

Parameter	Specification	Results	Pass/Fail
Cr m_0 Results	≤ 7.0 pg/0.0044 A-s	6.8	Passed
Precision	≤ 2.0 %	0.38	Passed

9.4 Copper Characteristic Mass and Zeeman Ratio

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

Parameter	Specification	Results	Pass/Fail
Cu m_0 Result	≤ 16.5 pg/0.0044 A-s	15.4	Not Applicable
Zeeman Ratio	0.52 ± 0.04	0.51	Not Applicable

10. Review:

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

Additional Comments

Additional Comments Regarding the PM
Zeeman Ratio $= \frac{Atomic\ Signal\ (Peak\ area)}{Atomic\ Signal\ (Peak\ area) + Background\ Signal\ (Peak\ area)}$ $= \frac{0.1442}{0.1442+0.1337}$ $= 0.518$

Review

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

This PinAAcle 900T Passes ☑ Fails ☐ the preventive maintenance.

Review of Preventive Maintenance:		
Authorized PerkinElmer Representative:	Prasit	Date: 18 DEC 2025 (DD-MMM-YYYY)
Authorized Customer Representative:		Date: 18 DEC 2025 (DD-MMM-YYYY)

PerkinElmer

MAINTENANCE AND TEST CERTIFICATE MODEL
OPTIMA 5300DV

Customer :	S.P.S.Consulting Service Co.,Ltd	Date Tested:	December 18, 2025
		Recommendation Recertification Period	6 Months
Address :	7 Soi Phaholyothin 24	Recertification Due:	June 28, 2026
	Paholyothin Road	Date Last Certified:	July 1, 2025
	Jompol Chatuchak, Bangkok 1090	Visit Number:	2of 2
User Name:	K.Phenpha Viphasthawat	PerkinElmer Phone:	02-719-6420 ext 206
Phone:	083-9269252	PerkinElmer Fax:	02-318-5597
Fax:	02-513-4221		

CONFIGURATION TESTED		ACCESSORIES/COMPONENT NOT INCLUDED
MODEL	**SERIAL NUMBER**	
OPTIMA 5300DV	077C7042401	
TESTED EQUIPMENT	**CALIBRATION NUMBER**	**EXPIRATION**
IPV Methods		
TEST STANDARD USED	**PART NUMBER**	**EXPIRATION DATE**
Multielement Standard	N069-1579	November 30, 2026
Wavecal Solution	N058-2152	July 30, 2026
VIS Wavecal solution	N930-2946	August 30, 2026
Instrument Cal. STD4	N930-0221	November 30, 2026
CUSTOMER SUPPLIED	**COMMENTS**	**CUSTOMER INITIALS**
2 % HNO3		
10 % HNO3		

PerkinElmer Scientific (Thailand) Co., Ltd.
290 Soi Soonvijai 4, Bangkapi, Huay Kwang, Bangkok 10310 Head Office

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MAINTENANCE AND TEST CERTIFICATE MODEL
OPTIMA 5300DV

SERIAL NUMBER 077C7042401 **DATE TESTED** December 18, 2025

1. MECHANICAL CHECKS	
A. Inspect and clean all fans and filters.	OK
B. Inspect and replace as necessary, all torch components including the RF coil.	OK
C. Inspect all tubing for sign of clacking or leaking.	OK
D. Adjust water and gas pressure regulator settings.	OK
E. Inspect and leak check pneumatics drawers.	OK
F. Clean the exterior of the instrument.	OK
2. OPTICAL CHECKS	
A. Inspect and clean all optical components.	OK
B. As reqiured, check and replace all purgefilters.	OK
C. Recheck optical alignment.	OK
3. COOLING SYSTEM CHECKS	
A. Perform preventive maintenance on chiller.	OK
B. Flush out the chiller every year.	N/A
4. PERFORMANCE CHECKS	
A. Torch View Alignment.	OK
B. Wavelength Calibration.	OK

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MAINTENANCE AND TEST CERTIFICATE MODEL
OPTIMA 5300DV

SERIAL NUMBER : 077C7042401 **DATE TESTED :** December 18, 2025

PARAMETER		SPECIFICATION		FINAL VALUE	
Spectral Resolution : UV	As 193.696 nm	≤ 0.007		0.00530	
	Ni 231.604 nm	≤ 0.008		0.00708	
	Ni 341.476 nm	≤ 0.012		0.00776	
Spectral Resolution : VIS	La 408.672 nm	≤ 0.020		0.01614	
	Ba 455.403 nm	≤ 0.025		0.02377	
Precision					
	As 193.656 nm	% RSD	< 1.0	0.67	%
	Zn 213.856 nm	% RSD	< 1.0	0.62	%
	Mn 257.610 nm	% RSD	< 1.0	0.88	%
	La 379.478 nm	% RSD	< 1.0	0.63	%
	Ba 455.403 nm	% RSD	< 1.0	0.65	%
	Ba 493.408 nm	% RSD	< 1.0	0.45	%
Detection Limits : Axial	Tl 190.080 nm	3(sd)		3.21	ppb
	As 193.696 nm	3(sd)		6.06	ppb
	Pb 220.353 nm	3(sd)		0.92	ppb
Detection Limits : Radial	As 193.696 nm	3(sd)		17.35	ppb
	Zn 213.856 nm	3(sd)		1.79	ppb
	Mn 257.610 nm	3(sd)		0.18	ppb
	La 379.478 nm	3(sd)		0.76	ppb
	Ba 455.403 nm	3(sd)		0.11	ppb
	Ba 493.408 nm	3(sd)		0.56	ppb
BEC : Axial (IB X 500)/(IS-IB)	Cd 226.502 nm	≤ 150 ppb		40.52	
BEC : Radial (IB X 1000)/(IS-IB)	Mn 257.610 nm	≤ 45 ppb		42.33	

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MAINTENANCE AND TEST CERTIFICATE MODEL

OPTIMA 5300DV

SERIAL NUMBER 077C7042401 **DATE TESTED** December 18, 2025

Remarks :

Commissioning follow as commissioning performance sheets.

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

[✔] meets

[ ] does not meet

the PerkinElmer Specifications listed on this certificate.

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

Service Department PerkinElmer Ltd.

Authorized Representative

(Wiphan Promlumda)

Service Engineer

PerkinElmer Scientific (Thailand) Co., Ltd.
290 Soi Soonvijai 4, Bangkapi, Huay Kwang, Bangkok 10310 Head Office