

ภาคผนวกที่ 5

เอกสารสอบเทียบความถูกต้องของเครื่องมือ

เอกสารที่ 5-1 เอกสารสอบเทียบเครื่องมือการตรวจวัดคุณภาพอากาศ

เอกสารที่ 5-2 เอกสารสอบเทียบเครื่องมือการตรวจวัดระดับเสียง

เอกสารที่ 5-3 เอกสารสอบเทียบเครื่องมือการตรวจวิเคราะห์คุณภาพน้ำทิ้ง

ตารางสรุปรายการเอกสารการสอบเทียบเครื่องมือตรวจวัดคุณภาพสิ่งแวดล้อม

รายการตรวจวัด	เครื่องมือเก็บตัวอย่าง	เครื่องมือตรวจวิเคราะห์
	ชื่อเครื่องมือ	ชื่อเครื่องมือ
คุณภาพอากาศ - TSP	- High Volume Air Sampler No. B01, B02, B11, B18, B21, B22, B31, B34, B43	- Electronic Balance
- PM ₁₀	- High Volume PM ₁₀ Air Sampler No. B02, B03, B10, B24, B26, B31, R01, R04	- Electronic Balance
- CO	- Personal Pump SKC No. B04, B13, B43, B46, B48, B65, B88	- CO Analyzer No. B01, B02
	- Rotameter No. L-B10	
- SO	- Gas Sampler Box No. B01, B03, B04, B08, B09, B10	- Spectrophotometer
- THC	- Personal Pump SKC No. B04, B13, B43, B46, B48, B65, B88	- THC Analyzer No. B01, R01
	- Rotameter No. L-B10	
- NO	- NO Analyzer No. B01, B03, B05, B06, B09, B15, B16, B19	- NO Analyzer No. B01, B03, B05, B06, B09, B15, B16, B19
ระดับเสียง - Leq 24 hr - Lmax - L90	- Acoustic Calibrator - Sound Level Meter No. ACO-B03, B04, B17, B21, B22, B25, B32, B34, B35, B37	-
คุณภาพน้ำ - pH	-	- pH Meter
- BOD ₅	-	- DO Meter
- TSS	-	- Electronic Balance
- TDS	-	- Electronic Balance
- Settleable Solids	-	- Electronic Balance
- Sulfide	-	- Electronic Balance
- Grease & Oil	-	- Electronic Balance

เอกสารที่ 5-1

เอกสารสอบเทียบเครื่องมือการตรวจวัดคุณภาพอากาศ



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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	01/11/2022	$y = 1.277x - 6.403$	0.999
B02	B02	03/11/2022	$y = 1.053x + 3.505$	0.995
B03	B03	03/11/2022	$y = 1.143x - 1.010$	0.998
B04	B04	04/11/2022	$y = 1.206x - 3.858$	0.996
B05	B05	01/11/2022	$y = 1.817x - 8.733$	0.997
B06	B06	01/11/2022	$y = 1.258x - 5.920$	0.998
B07	B07	01/11/2022	$y = 1.228x - 6.285$	0.998
B08	B08	08/11/2022	$y = 1.160x - 8.498$	0.996
B09	B09	03/11/2022	$y = 1.246x - 5.341$	0.997
B10	B10	01/11/2022	$y = 1.097x + 1.837$	0.997
B11	B11	07/11/2022	$y = 1.153x - 2.164$	0.998
B12	B12	04/11/2022	$y = 1.201x - 3.884$	0.998
B13	B13	01/11/2022	$y = 1.266x - 6.918$	0.995
B14	B14	02/11/2022	$y = 1.269x - 6.120$	0.999
B15	B15	02/11/2022	$y = 1.149x - 1.829$	0.997
B16	B16	02/11/2022	$y = 1.819x - 4.850$	0.999
B17	B17	04/11/2022	$y = 1.173x - 2.143$	0.997
B18	B18	04/11/2022	$y = 1.321x - 9.413$	0.996
B19	B19	02/11/2022	$y = 1.356x - 11.184$	0.997
B20	B20	04/11/2022	$y = 1.310x - 8.682$	0.997
B21	B21	03/11/2022	$y = 1.156x - 2.174$	0.999
B22	B22	02/11/2022	$y = 1.288x - 6.740$	0.998
B23	B23	04/11/2022	$y = 1.247x - 5.764$	0.998
B24	B24	01/11/2022	$y = 1.167x - 2.123$	0.999
B25	B25	02/11/2022	$y = 1.025x + 3.341$	0.997
B26	B26	02/11/2022	$y = 1.334x - 6.128$	0.996
B27	B27	03/11/2022	$y = 1.320x - 5.822$	0.997
B28	B28	02/11/2022	$y = 1.253x - 6.605$	0.999
B29	B29	08/11/2022	$y = 1.811x - 8.876$	0.997
B30	B30	07/11/2022	$y = 1.264x - 7.253$	0.996
B31	B31	07/11/2022	$y = 1.215x - 4.628$	0.996
B32	B32	03/11/2022	$y = 1.258x - 6.433$	0.997
B33	B33	03/11/2022	$y = 1.329x - 7.779$	0.995
B34	B34	03/11/2022	$y = 1.267x - 7.491$	0.998

Calibrated by :

Approved by :



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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	03/11/2022	$y = 1.306x - 9.466$	0.997
B36	B36	02/11/2022	$y = 1.213x - 5.932$	0.996
B37	B37	01/11/2022	$y = 1.253x - 5.208$	0.998
B38	B38	01/11/2022	$y = 1.228x - 6.530$	0.995
B39	B39	01/11/2022	$y = 1.319x - 9.149$	0.998
B40	B40	01/11/2022	$y = 1.196x - 4.045$	0.999
B41	B41	07/11/2022	$y = 1.179x - 2.811$	0.999
B42	B42	01/11/2022	$y = 1.209x - 3.713$	0.995
B43	B43	02/11/2022	$y = 1.187x - 3.331$	0.998
B44	B44	07/11/2022	$y = 1.298x - 8.171$	0.996
R01	R01	02/11/2022	$y = 1.289x - 8.227$	0.996
R02	R02	07/11/2022	$y = 1.307x - 10.185$	0.999
R03	R03	03/11/2022	$y = 1.250x - 7.634$	0.995
R04	R04	04/11/2022	$y = 1.157x - 3.267$	0.995
R05	R05	03/11/2022	$y = 1.273x - 8.211$	0.999
R06	R06	01/11/2022	$y = 1.297x - 8.271$	0.999
R07	R07	02/11/2022	$y = 1.071x + 1.468$	0.995
R08	R08	01/11/2022	$y = 1.206x - 5.068$	0.997
R09	R09	01/11/2022	$y = 1.252x - 7.084$	0.995
R10	R10	03/11/2022	$y = 1.246x - 5.817$	0.999
R11	R11	03/11/2022	$y = 1.117x - 1.158$	0.998
R12	R12	02/11/2022	$y = 1.351x - 12.068$	0.996
R13	R13	03/11/2022	$y = 1.118x - 0.601$	0.998
R14	R14	03/11/2022	$y = 1.164x - 2.415$	0.996
R15	R15	03/11/2022	$y = 1.134x - 1.733$	0.998
R16	R16	04/11/2022	$y = 1.182x - 4.717$	0.998
R17	R17	07/11/2022	$y = 1.218x - 5.366$	0.998
R18	R18	04/11/2022	$y = 1.233x - 5.977$	0.996
R19	R19	07/11/2022	$y = 1.277x - 7.752$	0.997
R20	R20	04/11/2022	$y = 1.327x - 10.828$	0.997

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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	01/02/2023	$y = 1.278x - 0.652$	0.997
B02	B02	02/02/2023	$y = 1.147x + 0.663$	0.999
B03	B03	01/02/2023	$y = 1.123x - 0.622$	0.995
B04	B04	01/02/2023	$y = 1.229x - 4.835$	0.996
B05	B05	02/02/2023	$y = 1.280x - 6.358$	0.997
B06	B06	01/02/2023	$y = 1.251x - 5.438$	0.999
B07	B07	03/02/2023	$y = 1.165x - 3.515$	0.996
B08	B08	03/02/2023	$y = 1.269x - 7.559$	0.997
B09	B09	01/02/2023	$y = 1.198x - 2.843$	0.998
B10	B10	01/02/2023	$y = 1.128x + 0.785$	0.999
B11	B11	02/02/2023	$y = 1.138x - 1.752$	0.999
B12	B12	01/02/2023	$y = 1.195x - 4.080$	0.998
B13	B13	01/02/2023	$y = 1.254x - 5.913$	0.999
B14	B14	03/02/2023	$y = 1.291x - 7.822$	0.999
B15	B15	01/02/2023	$y = 1.149x - 1.829$	0.997
B16	B16	01/02/2023	$y = 1.287x - 7.502$	0.997
B17	B17	02/02/2023	$y = 1.207x - 4.147$	1.000
B18	B18	01/02/2023	$y = 1.277x - 7.238$	0.999
B19	B19	03/02/2023	$y = 1.243x - 6.520$	0.995
B20	B20	01/02/2023	$y = 1.267x - 7.055$	1.000
B21	B21	03/02/2023	$y = 1.141x - 1.101$	0.999
B22	B22	03/02/2023	$y = 1.221x - 5.534$	0.996
B23	B23	02/02/2023	$y = 1.197x - 4.328$	0.995
B24	B24	01/02/2023	$y = 1.159x - 2.269$	0.999
B25	B25	01/02/2023	$y = 1.050x + 2.684$	0.998
B26	B26	03/02/2023	$y = 1.253x - 6.203$	0.997
B27	B27	03/02/2023	$y = 1.220x - 5.822$	0.997
B28	B28	01/02/2023	$y = 1.251x - 6.762$	0.999
B29	B29	01/02/2023	$y = 1.201x - 3.793$	0.998
B30	B30	03/02/2023	$y = 1.242x - 6.040$	0.995
B31	B31	03/02/2023	$y = 1.255x - 6.808$	0.999
B32	B32	02/02/2023	$y = 1.249x - 6.292$	0.997
B33	B33	02/02/2023	$y = 1.260x - 5.168$	0.997
B34	B34	01/02/2023	$y = 1.272x - 7.454$	1.000

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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	01/02/2023	$y = 1.194x - 4.992$	0.995
B36	B36	02/02/2023	$y = 1.201x - 3.946$	0.997
B37	B37	02/02/2023	$y = 1.284x - 6.745$	0.997
B38	B38	02/02/2023	$y = 1.250x - 6.733$	0.998
B39	B39	01/02/2023	$y = 1.268x - 7.186$	0.998
B40	B40	03/02/2023	$y = 1.214x - 4.324$	0.998
B41	B41	03/02/2023	$y = 1.176x - 2.734$	0.999
B42	B42	02/02/2023	$y = 1.283x - 8.167$	0.997
B43	B43	02/02/2023	$y = 1.197x - 3.772$	0.996
B44	B44	02/02/2023	$y = 1.249x - 7.038$	0.995
R01	R01	01/02/2023	$y = 1.287x - 8.462$	0.998
R02	R02	01/02/2023	$y = 1.239x - 6.678$	0.998
R03	R03	03/02/2023	$y = 1.254x - 7.928$	0.999
R04	R04	02/02/2023	$y = 1.206x - 3.694$	0.999
R05	R05	02/02/2023	$y = 1.237x - 6.503$	0.997
R06	R06	02/02/2023	$y = 1.239x - 4.541$	0.995
R07	R07	03/02/2023	$y = 1.060x + 1.983$	0.999
R08	R08	03/02/2023	$y = 1.274x - 8.050$	0.998
R09	R09	02/02/2023	$y = 1.280x - 7.005$	0.998
R10	R10	03/02/2023	$y = 1.244x - 5.980$	1.000
R11	R11	03/02/2023	$y = 1.097x - 0.462$	0.998
R12	R12	02/02/2023	$y = 1.151x - 2.727$	0.995
R13	R13	02/02/2023	$y = 1.134x - 1.526$	1.000
R14	R14	02/02/2023	$y = 1.172x - 2.510$	0.999
R15	R15	01/02/2023	$y = 1.131x - 2.129$	0.998
R16	R16	01/02/2023	$y = 1.202x - 5.830$	0.998
R17	R17	01/02/2023	$y = 1.182x - 3.261$	0.998
R18	R18	03/02/2023	$y = 1.217x - 5.060$	0.999
R19	R19	03/02/2023	$y = 1.228x - 6.084$	0.998
R20	R20	03/02/2023	$y = 1.277x - 9.434$	0.997

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High Volume Air Sampler Calibration Report

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

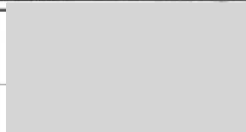
Calibration Data

High Volume Air Sampler Data		Calibration Data		
Recorder No.	Blower No.	Date	Actual Flowrate (ft ³ /min)	R ²
B01	B01	03/05/2023	y = 1.313x-6.873	0.998
B02	B02	03/05/2023	y = 1.116x+2.378	0.999
B03	B03	03/05/2023	y = 1.102x-0.827	0.997
B04	B04	02/05/2023	y = 1.246x-6.815	0.999
B05	B05	02/05/2023	y = 1.331x-9.589	0.998
B06	B06	04/05/2023	y = 1.282x-7.814	0.999
B07	B07	03/05/2023	y = 1.194x-5.233	0.999
B08	B08	03/05/2023	y = 1.274x-8.294	0.998
B09	B09	01/05/2023	y = 1.221x-3.849	0.997
B10	B10	01/05/2023	y = 1.161x-2.610	0.997
B11	B11	02/05/2023	y = 1.164x-1.998	0.998
B12	B12	02/05/2023	y = 1.200x-4.528	0.999
B13	B13	02/05/2023	y = 1.216x-4.270	0.998
B14	B14	02/05/2023	y = 1.326x-8.548	1.000
B15	B15	02/05/2023	y = 1.222x-5.693	0.997
B16	B16	01/05/2023	y = 1.287x-7.502	0.997
B17	B17	01/05/2023	y = 1.255x-6.198	0.999
B18	B18	02/05/2023	y = 1.243x-6.744	0.997
B19	B19	01/05/2023	y = 1.320x-8.840	0.999
B20	B20	03/05/2023	y = 1.245x-6.585	0.998
B21	B21	03/05/2023	y = 1.186x-3.464	0.999
B22	B22	03/05/2023	y = 1.297x-8.592	0.997
B23	B23	02/05/2023	y = 1.216x-4.912	0.998
B24	B24	02/05/2023	y = 1.144x-1.869	0.999
B25	B25	02/05/2023	y = 1.079x+1.654	0.999
B26	B26	02/05/2023	y = 1.218x-5.191	0.997
B27	B27	02/05/2023	y = 1.225x-5.812	0.998
B28	B28	02/05/2023	y = 1.305x-8.342	0.999
B29	B29	02/05/2023	y = 1.285x-8.182	0.996
B30	B30	02/05/2023	y = 1.299x-6.294	0.997
B31	B31	03/05/2023	y = 1.270x-6.531	0.998
B32	B32	02/05/2023	y = 1.249x-6.292	0.997
B33	B33	01/05/2023	y = 1.260x-7.688	0.997
B34	B34	02/05/2023	y = 1.291x-8.548	0.999

Calibrated by :



Approved by :



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Calibration Data

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Recorder No.	Blower No.	Date	Actual Flowrate (ft ³ /min)	R ²
B35	B35	01/05/2023	y = 1.310x-9.363	0.996
B36	B36	02/05/2023	y = 1.201x-4.886	0.999
B37	B37	02/05/2023	y = 1.239x-4.586	0.998
B38	B38	02/05/2023	y = 1.304x-9.606	0.997
B39	B39	01/05/2023	y = 1.240x-5.469	0.998
B40	B40	03/05/2023	y = 1.196x-4.045	0.999
B41	B41	03/05/2023	y = 1.179x-2.611	0.999
B42	B42	02/05/2023	y = 1.246x-7.813	0.996
B43	B43	02/05/2023	y = 1.206x-3.694	0.999
B44	B44	02/05/2023	y = 1.302x-9.108	0.998
R01	R01	02/05/2023	y = 1.268x-7.113	0.995
R02	R02	01/05/2023	y = 1.235x-6.759	0.997
R03	R03	03/05/2023	y = 1.247x-7.848	0.996
R04	R04	02/05/2023	y = 1.161x-1.778	0.999
R05	R05	02/05/2023	y = 1.288x-9.494	0.999
R06	R06	02/05/2023	y = 1.277x-6.891	0.997
R07	R07	02/05/2023	y = 1.046x+2.772	1.000
R08	R08	02/05/2023	y = 1.206x-5.068	0.997
R09	R09	02/05/2023	y = 1.296x-8.463	0.999
R10	R10	02/05/2023	y = 1.244x-6.477	0.999
R11	R11	02/05/2023	y = 1.097x-0.462	0.998
R12	R12	02/05/2023	y = 1.210x-5.084	0.998
R13	R13	01/05/2023	y = 1.149x-1.965	1.000
R14	R14	01/05/2023	y = 1.189x-3.035	0.996
R15	R15	02/05/2023	y = 1.161x-3.437	0.998
R16	R16	01/05/2023	y = 1.158x-4.330	0.997
R17	R17	02/05/2023	y = 1.218x-5.356	0.998
R18	R18	02/05/2023	y = 1.234x-5.546	0.999
R19	R19	02/05/2023	y = 1.267x-7.058	0.999
R20	R20	01/05/2023	y = 1.264x-6.743	0.999

Calibrated by :



Approved by :





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Tel : (662) 995-4376-77, Fax : (662) 513-4221, E-mail : ssp@spscs.com, www.spscs.com

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 (l/min)	R ²
B01	B01	02/11/2022	$y = 1.208x - 0.557$	0.998
B02	B02	02/11/2022	$y = 1.024x + 3.782$	0.999
B03	B03	02/11/2022	$y = 1.243x - 4.455$	0.998
B04	B04	03/11/2022	$y = 1.293x - 7.303$	0.997
B05	B05	03/11/2022	$y = 1.262x - 5.903$	0.999
B06	B06	04/11/2022	$y = 1.313x - 7.710$	0.997
B07	B07	02/11/2022	$y = 1.290x - 8.871$	0.998
B08	B08	04/11/2022	$y = 1.330x - 6.996$	0.999
B09	B09	04/11/2022	$y = 1.260x - 5.331$	0.995
B10	B10	02/11/2022	$y = 1.298x - 8.225$	0.997
B11	B11	04/11/2022	$y = 1.273x - 5.640$	0.995
B12	B12	04/11/2022	$y = 1.282x - 7.018$	0.996
B13	B13	01/11/2022	$y = 1.320x - 9.261$	0.998
B14	B14	02/11/2022	$y = 1.230x - 3.865$	0.998
B15	B15	02/11/2022	$y = 1.166x - 2.184$	0.997
B16	B16	01/11/2022	$y = 1.260x - 2.121$	0.998
B17	B17	04/11/2022	$y = 1.277x - 4.847$	0.998
B18	B18	01/11/2022	$y = 1.166x - 1.164$	0.999
B19	B19	02/11/2022	$y = 1.094x + 1.145$	0.999
B20	B20	02/11/2022	$y = 1.221x - 5.301$	0.997
B21	B21	01/11/2022	$y = 1.176x - 0.519$	0.999
B22	B22	02/11/2022	$y = 1.266x - 7.131$	0.998
B23	B23	03/11/2022	$y = 1.181x - 2.246$	0.999
B24	B24	03/11/2022	$y = 1.253x - 5.274$	0.995
B25	B25	04/11/2022	$y = 1.159x - 3.062$	0.996
B26	B26	03/11/2022	$y = 1.264x - 6.817$	0.996
B27	B27	03/11/2022	$y = 1.332x - 10.385$	0.996
B28	B28	03/11/2022	$y = 1.165x - 2.689$	0.998
B29	B29	03/11/2022	$y = 1.271x - 7.065$	0.998
B30	B30	01/11/2022	$y = 1.274x - 7.435$	0.996
B31	B31	01/11/2022	$y = 1.244x - 3.976$	0.999
B32	B32	01/11/2022	$y = 1.186x - 1.647$	0.999
B33	B33	04/11/2022	$y = 1.268x - 6.742$	0.996
B34	B34	01/11/2022	$y = 1.321x - 5.654$	0.998

Calibrated by :

Approved by :



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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 (l/min)	R ²
R01	R01	02/11/2022	$y = 1.267x - 6.210$	0.998
R02	R02	07/11/2022	$y = 1.240x - 5.054$	0.996
R03	R03	03/11/2022	$y = 1.199x - 4.666$	0.998
R04	R04	04/11/2022	$y = 1.215x - 6.193$	0.999
R05	R05	04/11/2022	$y = 1.210x - 5.386$	0.998
R06	R06	02/11/2022	$y = 1.270x - 6.263$	0.995
R07	R07	07/11/2022	$y = 1.237x - 5.269$	0.998
R08	R08	03/11/2022	$y = 1.358x - 7.271$	0.996
R09	R09	07/11/2022	$y = 1.302x - 6.317$	0.999
R10	R10	03/11/2022	$y = 1.196x - 4.622$	0.997
R11	R11	02/11/2022	$y = 1.284x - 7.142$	0.996
R12	R12	02/11/2022	$y = 1.253x - 7.460$	0.996
R13	R13	04/11/2022	$y = 1.262x - 6.240$	0.998
R14	R14	04/11/2022	$y = 1.354x - 6.659$	0.999
R15	R15	03/11/2022	$y = 1.399x - 9.065$	0.998
R16	R16	09/11/2022	$y = 1.263x - 7.053$	0.995
R17	R17	07/11/2022	$y = 1.224x - 4.966$	0.997
R18	R18	07/11/2022	$y = 1.235x - 6.907$	0.999
R19	R19	03/11/2022	$y = 1.302x - 9.454$	0.995
R20	R20	04/11/2022	$y = 1.244x - 6.211$	0.999

Calibrated by :

Approved by :



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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	02/02/2023	y = 1.210x - 0.261	0.997
B02	B02	02/02/2023	y = 1.046x + 2.414	0.998
B03	B03	02/02/2023	y = 1.199x - 4.047	0.996
B04	B04	02/02/2023	y = 1.288x - 7.602	0.997
B05	B05	01/02/2023	y = 1.222x - 4.886	1.000
B06	B06	01/02/2023	y = 1.210x - 3.612	0.996
B07	B07	03/02/2023	y = 1.270x - 6.088	0.999
B08	B08	01/02/2023	y = 1.277x - 5.288	0.998
B09	B09	03/02/2023	y = 1.289x - 6.478	0.999
B10	B10	03/02/2023	y = 1.266x - 8.106	0.997
B11	B11	01/02/2023	y = 1.258x - 6.917	0.995
B12	B12	02/02/2023	y = 1.192x - 3.640	0.998
B13	B13	02/02/2023	y = 1.289x - 7.913	0.998
B14	B14	02/02/2023	y = 1.250x - 4.233	0.999
B15	B15	01/02/2023	y = 1.118x + 0.803	0.999
B16	B16	03/02/2023	y = 1.297x - 3.106	0.998
B17	B17	01/02/2023	y = 1.204x - 4.477	0.996
B18	B18	02/02/2023	y = 1.176x - 1.624	0.998
B19	B19	02/02/2023	y = 1.097x + 1.230	0.999
B20	B20	03/02/2023	y = 1.188x - 4.372	0.999
B21	B21	03/02/2023	y = 1.166x - 0.146	0.996
B22	B22	03/02/2023	y = 1.269x - 6.647	0.998
B23	B23	02/02/2023	y = 1.197x - 2.685	1.000
B24	B24	02/02/2023	y = 1.251x - 6.437	0.995
B25	B25	01/02/2023	y = 1.144x - 2.851	0.997
B26	B26	01/02/2023	y = 1.249x - 5.704	0.996
B27	B27	01/02/2023	y = 1.241x - 5.428	0.997
B28	B28	01/02/2023	y = 1.198x - 4.626	0.998
B29	B29	02/02/2023	y = 1.244x - 7.658	0.997
B30	B30	02/02/2023	y = 1.246x - 7.229	0.997
B31	B31	02/02/2023	y = 1.178x - 0.243	0.995
B32	B32	03/02/2023	y = 1.201x - 2.954	0.998
B33	B33	03/02/2023	y = 1.168x - 1.341	0.997
B34	B34	01/02/2023	y = 1.237x - 2.684	0.995

Calibrated by :

Approved by :



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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
R01	R01	01/02/2023	y = 1.253x - 8.016	0.996
R02	R02	01/02/2023	y = 1.246x - 5.052	0.998
R03	R03	02/02/2023	y = 1.239x - 5.451	0.999
R04	R04	03/02/2023	y = 1.263x - 8.320	0.999
R05	R05	03/02/2023	y = 1.193x - 4.904	0.998
R06	R06	03/02/2023	y = 1.270x - 7.534	0.995
R07	R07	03/02/2023	y = 1.244x - 5.727	0.998
R08	R08	02/02/2023	y = 1.277x - 7.820	0.998
R09	R09	02/02/2023	y = 1.183x - 5.015	0.996
R10	R10	01/02/2023	y = 1.200x - 4.576	0.999
R11	R11	01/02/2023	y = 1.225x - 4.833	0.995
R12	R12	03/02/2023	y = 1.273x - 8.109	0.998
R13	R13	01/02/2023	y = 1.281x - 6.830	1.000
R14	R14	01/02/2023	y = 1.288x - 7.622	0.999
R15	R15	02/02/2023	y = 1.282x - 8.311	0.997
R16	R16	02/02/2023	y = 1.246x - 5.817	0.995
R17	R17	03/02/2023	y = 1.263x - 7.123	0.999
R18	R18	03/02/2023	y = 1.203x - 5.463	0.999
R19	R19	01/02/2023	y = 1.204x - 4.399	0.996
R20	R20	01/02/2023	y = 1.259x - 8.655	0.997

Calibrated by :

Approved by :



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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	02/05/2023	$y = 1.229x - 0.738$	0.998
B02	B02	03/05/2023	$y = 1.024x + 2.738$	0.999
B03	B03	04/05/2023	$y = 1.265x - 6.624$	0.996
B04	B04	04/05/2023	$y = 1.213x - 4.170$	0.999
B05	B05	02/05/2023	$y = 1.240x - 5.184$	0.998
B06	B06	02/05/2023	$y = 1.196x - 4.232$	0.995
B07	B07	03/05/2023	$y = 1.256x - 5.476$	0.998
B08	B08	04/05/2023	$y = 1.215x - 2.945$	0.995
B09	B09	03/05/2023	$y = 1.199x - 3.875$	0.998
B10	B10	03/05/2023	$y = 1.281x - 8.260$	0.998
B11	B11	03/05/2023	$y = 1.311x - 9.505$	0.996
B12	B12	04/05/2023	$y = 1.289x - 6.825$	0.998
B13	B13	04/05/2023	$y = 1.267x - 6.736$	0.997
B14	B14	04/05/2023	$y = 1.218x - 4.099$	0.995
B15	B15	04/05/2023	$y = 1.158x - 0.666$	0.995
B16	B16	03/05/2023	$y = 1.259x - 1.610$	1.000
B17	B17	02/05/2023	$y = 1.266x - 6.673$	0.998
B18	B18	02/05/2023	$y = 1.205x - 3.107$	0.999
B19	B19	03/05/2023	$y = 1.108x + 0.786$	0.999
B20	B20	03/05/2023	$y = 1.193x - 4.089$	0.996
B21	B21	03/05/2023	$y = 1.252x - 3.159$	0.995
B22	B22	03/05/2023	$y = 1.256x - 6.331$	0.996
B23	B23	03/05/2023	$y = 1.207x - 3.098$	0.997
B24	B24	03/05/2023	$y = 1.298x - 8.224$	0.997
B25	B25	03/05/2023	$y = 1.209x - 5.271$	0.999
B26	B26	03/05/2023	$y = 1.204x - 3.756$	0.999
B27	B27	02/05/2023	$y = 1.278x - 8.266$	0.999
B28	B28	03/05/2023	$y = 1.165x - 3.132$	0.997
B29	B29	04/05/2023	$y = 1.228x - 6.940$	0.995
B30	B30	04/05/2023	$y = 1.140x - 1.179$	0.996
B31	B31	04/05/2023	$y = 1.134x + 2.226$	0.999
B32	B32	04/05/2023	$y = 1.166x - 1.023$	0.999
B33	B33	04/05/2023	$y = 1.261x - 9.211$	0.996
B34	B34	04/05/2023	$y = 1.264x - 3.650$	0.999

Calibrated by :

Approved by :



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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
R01	R01	01/05/2023	$y = 1.189x - 4.728$	0.996
R02	R02	01/05/2023	$y = 1.265x - 5.602$	0.999
R03	R03	01/05/2023	$y = 1.215x - 5.146$	0.997
R04	R04	01/05/2023	$y = 1.226x - 6.855$	0.997
R05	R05	01/05/2023	$y = 1.212x - 5.960$	1.000
R06	R06	04/05/2023	$y = 1.238x - 5.381$	0.995
R07	R07	04/05/2023	$y = 1.283x - 7.908$	0.998
R08	R08	04/05/2023	$y = 1.281x - 7.778$	1.000
R09	R09	03/05/2023	$y = 1.202x - 6.317$	0.999
R10	R10	02/05/2023	$y = 1.169x - 2.499$	0.999
R11	R11	01/05/2023	$y = 1.210x - 4.423$	0.996
R12	R12	01/05/2023	$y = 1.176x - 3.099$	0.997
R13	R13	01/05/2023	$y = 1.276x - 6.852$	0.997
R14	R14	03/05/2023	$y = 1.207x - 4.849$	0.996
R15	R15	03/05/2023	$y = 1.198x - 4.617$	0.997
R16	R16	04/05/2023	$y = 1.199x - 5.485$	0.995
R17	R17	04/05/2023	$y = 1.184x - 4.669$	0.998
R18	R18	04/05/2023	$y = 1.167x - 4.142$	0.998
R19	R19	04/05/2023	$y = 1.197x - 5.308$	0.997
R20	R20	02/05/2023	$y = 1.244x - 8.211$	0.999

Calibrated by :

Approved by :



CERTIFICATE No : 22M2567

REFERENCE No : 64386-1

PAGE : 1 OF 2

Certificate of Calibration

EQUIPMENT : DIGITAL BALANCE

MANUFACTURER : METTLER TOLEDO

MODEL : XS 105DU

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 : TETNITHI W.

CALIBRATION DATE : 11-Mar-22

APPROVED BY :

ISSUED DATE : 17-Mar-22

RECEIVED DATE : 11-Mar-22



CERTIFICATE No : 22M2567

PAGE : 2 OF 2

Calibration Report

EQUIPMENT : DIGITAL BALANCE MODEL : XS 105DU

MANUFACTURER : METTLER TOLEDO S/N : 1126422905

ID No : BA 05/50 RECEIVED DATE : 11-Mar-22

AIR PRESSURE : 1008mbar = 1mbar CALIBRATION DATE : 11-Mar-22

AMBIENT TEMPERATURE : 22° C ± 1° C RELATIVE HUMIDITY : 49 %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 LINEARITY TEST. OFF-CENTER LOADING WAS MEASURED BY USING STANDARD WEIGHTS PLACED ON THE PAN AND MOVED TO VARIOUS POSITIONS ON THE PAN.

2. REFERENCE STANDARD INSTRUMENTS :-

INSTRUMENT	MODEL	SERIAL No	CERTIFICATE No	DUE DATE
1) STANDARD WEIGHT SET	E2	QK-I-151	C02210415	09-Feb-23

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

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

5. THIS CERTIFICATE IS TRACEABLE TO THE INTERNATIONAL SYSTEM OF UNIT MAINTAINED AT:-
- NATIONAL INSTITUTE OF METROLOGY (THAILAND) THROUGH CENTRAL BUREAU OF WEIGHTS&MEASURES

RESULT OF CALIBRATION :- WITHOUT ADJUSTMENT

1. ZERO SETTING FUNCTION : NORMAL

2. TARE FUNCTION : NORMAL

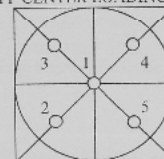
3. REPEATABILITY OF READING AT 20 g WAS 0.000004 g

4. REPEATABILITY OF READING AT 100 g WAS 0.000048 g

5. DEPARTURE FROM NOMINAL VALUE/ LINEARITY

NOMINAL VALUE (g)	BALANCE READING (g)	CORRECTION (g)	UNCERTAINTY (± g)
0.00	0.00000	0.00000	0.000058
0.02	0.01999	0.00001	0.000058
0.10	0.09999	0.00001	0.000059
0.20	0.19999	0.00001	0.000059
0.50	0.50001	-0.00001	0.000058
1.00	1.00001	-0.00001	0.000059
2.00	2.00000	0.00000	0.000059
5.00	5.00001	-0.00001	0.000061
10.00	10.00005	-0.00005	0.000063
20.00	20.00006	-0.00006	0.000069
50.00	50.00000	0.00000	0.00011
100.00	100.00001	-0.00001	0.00019
120.00	120.00001	-0.00001	0.00022

6. OFF CENTER LOADING ERROR



POINT	READING (g)
1	10.00001
2	10.00002
3	10.00001
4	10.00001
5	10.00002
OFF-CENTER LOADING	0.00001

NOTE: THIS CALIBRATION WAS CARRIED OUT AT THE CUSTOMER'S PLACE AT PRODUCTION 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



CERTIFICATE No : 23M2441
REFERENCE No : 68471-1

PAGE : 1 OF 2

Certificate of Calibration

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

CALIBRATED BY : ATSAWIN Y.
CALIBRATION DATE : 10-Mar-23
APPROVED BY :
ISSUED DATE : 16-Mar-23
RECEIVED DATE : 10-Mar-23

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



CERTIFICATE No : 23M2441

PAGE : 2 OF 2

Calibration Report

EQUIPMENT : DIGITAL BALANCE MODEL : XS105DU
MANUFACTURER : METTLER TOLEDO S/N : 1126422905
ID No : BA 05/50 RECEIVED DATE : 10-Mar-23
AIR PRESSURE : 1010mbar \pm 1mbar CALIBRATION DATE : 10-Mar-23
AMBIENT TEMPERATURE : 23°C \pm 1°C RELATIVE HUMIDITY : 49 %RH \pm 10 % RH

CONDITION OF THIS RESULTS OF CALIBRATION

1. THIS INSTRUMENT WAS CALIBRATED BY ACCORDING TO UKAS LAB 14 EDITION 6:2019 BY USING KNOWN WEIGHT STANDARD WEIGHT. THE BALANCE WAS 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 LINEARITY TEST. OFF-CENTER LOADING WAS MEASURED BY USING STANDARD WEIGHTS PLACED ON THE PAN AND MOVED TO VARIOUS POSITIONS ON THE PAN.

2. REFERENCE STANDARD INSTRUMENTS :-

INSTRUMENT	MODEL	SERIAL No	CERTIFICATE No	DUE DATE
1) STANDARD WEIGHT SET	E2	QK-1-151	M2302013S	02-Feb-25
2) STANDARD WEIGHT	E2	15843	M2302014S	02-Feb-25

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

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

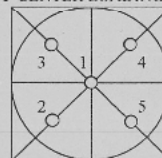
5. THIS CERTIFICATE IS TRACEABLE TO THE INTERNATIONAL SYSTEM OF UNIT MAINTAINED AT:-
- NATIONAL INSTITUTE OF METROLOGY (THAILAND) THROUGH CENTRAL BUREAU OF WEIGHTS&MEASURES

RESULT OF CALIBRATION :- WITHOUT ADJUSTMENT

- ZERO SETTING FUNCTION : NORMAL
- TARE FUNCTION : NORMAL
- REPEATABILITY OF READING AT 200 g WAS 0 g
- DEPARTURE FROM NOMINAL VALUE/ LINEARITY

NOMINAL VALUE (g)	BALANCE READING (g)	CORRECTION (g)	UNCERTAINTY (\pm g)
0.00	0.00000	0.00000	0.000039
0.02	0.02000	0.00000	0.000039
0.10	0.10000	0.00000	0.000039
0.20	0.20001	-0.00001	0.000040
0.50	0.50001	-0.00001	0.000040
1.00	1.00000	0.00000	0.000041
2.00	2.00003	-0.00003	0.000042
5.00	5.00001	-0.00001	0.000046
10.00	10.00003	-0.00003	0.000053
20.00	20.00005	-0.00005	0.000067
50.00	50.0001	-0.0001	0.00011
100.00	100.0001	-0.0001	0.00019
200.00	200.0001	-0.0001	0.00032

5. OFF CENTER LOADING ERROR



POINT	READING (g)
1	50.0000
2	50.0001
3	50.0000
4	50.0000
5	49.9999
OFF-CENTER LOADING	0.0001

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

END OF CALIBRATION REPORT



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Tel : (662) 939-4370-72 Fax : (662) 513-4221 E-mail : sales@spscon.com, www.spscon.com

Personal Pump Calibration Report

Calibration Method : Dry Cal Primary Flowmeter

Model : Defender 510-H

S/N : 136164

Environmental Conditions

Temperature : 25 ± 3 °C
Pressure : 1010 ± 15 mmbar

Personal Pump Data				Calibration Data									
No.	Brand	Model	Serial No.	Date	Flow Rate (ml/min)						Value From Calibration Curve		
					Setting			Actual (Q std.)			y		
					1	2	3	1	2	3	y	R ²	
B01	SKC	224-PCXR4	262101	03/01/2023	1,000	1,500	2,000	993	1,497	1,998	1.003x - 5.584	1.000	
B02	SKC	224-PCXR4	626166	03/01/2023	1,000	1,500	2,000	1,003	1,505	2,001	1.009x - 19.667	0.999	
B03	SKC	224-PCXR4	612968	03/01/2023	1,000	1,500	2,000	998	1,494	2,000	1.006x - 12.109	1.000	
B04	SKC	224-PCXR4	602804	04/01/2023	1,000	1,500	2,000	1,000	1,502	1,995	1.000x - 0.899	1.000	
B05	SKC	224-PCXR4	612693	04/01/2023	1,000	1,500	2,000	1,003	1,500	2,003	1.012x - 22.224	0.999	
B06	SKC	224-PCXR4	262186	03/01/2023	1,000	1,500	2,000	995	1,508	2,005	1.011x - 20.273	1.000	
B07	SKC	224-PCXR4	626282	03/01/2023	1,000	1,500	2,000	998	1,492	1,995	0.993x - 6.088	1.000	
B08	SKC	224-PCXR4	626100	03/01/2023	1,000	1,500	2,000	1,003	1,500	2,003	1.012x - 23.308	0.999	
B09	SKC	224-PCXR4	626479	03/01/2023	1,000	1,500	2,000	998	1,490	1,994	0.995x + 1.117	1.000	
B10	SKC	224-PCXR4	091950	03/01/2023	1,000	1,500	2,000	992	1,503	2,001	1.018x - 36.582	0.999	
B11	SKC	224-PCXR8	644915	05/01/2023	1,000	1,500	2,000	996	1,480	1,999	1.003x - 8.256	1.000	
B12	SKC	224-PCXR4	034656	05/01/2023	1,000	1,500	2,000	1,003	1,503	2,003	1.010x - 19.324	0.999	
B13	SKC	224-PCXR4	602073	05/01/2023	1,000	1,500	2,000	995	1,500	1,998	1.001x - 3.474	1.000	
B14	SKC	224-PCXR4	626313	04/01/2023	1,000	1,500	2,000	999	1,491	1,988	0.992x + 6.844	1.000	
B15	SKC	224-PCXR4	626474	04/01/2023	1,000	1,500	2,000	1,001	1,502	2,005	1.014x - 25.558	0.999	
B16	SKC	224-PCXR4	626477	04/01/2023	1,000	1,500	2,000	994	1,504	2,001	1.015x - 31.345	0.999	
B17	SKC	224-PCXR4	626860	04/01/2023	1,000	1,500	2,000	997	1,494	1,991	0.997x - 0.559	1.000	
B18	SKC	224-PCXR4	691484	04/01/2023	1,000	1,500	2,000	1,003	1,500	2,001	1.008x - 17.589	0.999	
B19	SKC	224-PCXR4	691599	03/01/2023	1,000	1,500	2,000	993	1,503	1,999	1.007x - 11.874	1.000	
B20	SKC	224-PCXR4	691587	03/01/2023	1,000	1,500	2,000	992	1,504	1,999	1.016x - 32.235	0.999	
B21	SKC	224-PCXR4	691631	03/01/2023	1,000	1,500	2,000	993	1,499	1,994	1.001x - 7.107	1.000	
B22	SKC	224-PCXR4	691654	05/01/2023	1,000	1,500	2,000	1,003	1,501	2,003	1.011x - 21.107	0.999	
B23	SKC	224-PCXR4	798593	05/01/2023	1,000	1,500	2,000	992	1,507	2,002	1.015x - 34.883	0.999	
B24	SKC	224-PCXR4	626363	05/01/2023	1,000	1,500	2,000	1,000	1,502	2,000	1.011x - 22.387	0.999	
B25	SKC	224-PCXR4	798489	06/01/2023	1,000	1,500	2,000	1,001	1,492	2,001	0.998x + 1.101	1.000	
B26	SKC	224-PCXR4	798479	06/01/2023	1,000	1,500	2,000	999	1,500	1,993	0.996x + 4.008	1.000	
B27	SKC	224-PCXR4	691673	04/01/2023	1,000	1,500	2,000	994	1,503	2,002	1.016x - 32.071	0.999	
B28	SKC	224-PCXR4	691670	04/01/2023	1,000	1,500	2,000	1,002	1,500	2,002	1.012x - 22.515	0.999	
B29	SKC	224-PCXR4	626472	04/01/2023	1,000	1,500	2,000	1,000	1,496	1,998	1.001x - 4.942	1.000	
B30	SKC	224-PCXR4	691489	03/01/2023	1,000	1,500	2,000	1,004	1,510	2,004	1.006x - 12.460	0.999	
B31	SKC	224-PCXR4	691509	02/01/2023	1,000	1,500	2,000	992	1,497	1,998	1.006x - 12.711	1.000	
B32	SKC	224-PCXR4	091587	06/01/2023	1,000	1,500	2,000	991	1,504	2,001	1.016x - 32.322	0.999	
B33	SKC	224-PCXR4	091756	05/01/2023	1,000	1,500	2,000	993	1,497	1,991	0.997x - 0.004	1.000	
B34	SKC	224-PCXR4	612962	05/01/2023	1,000	1,500	2,000	1,002	1,501	2,002	1.007x - 14.195	1.000	
B35	SKC	224-PCXR4	602682	05/01/2023	1,000	1,500	2,000	993	1,498	1,995	1.002x - 8.448	1.000	
B36	SKC	224-PCXR4	626164	03/01/2023	1,000	1,500	2,000	999	1,496	1,999	1.001x - 3.424	1.000	
B37	SKC	224-PCXR4	626866	03/01/2023	1,000	1,500	2,000	994	1,506	1,999	1.013x - 27.815	0.999	
B38	SKC	224-PCXR4	626167	03/01/2023	1,000	1,500	2,000	997	1,496	1,996	0.999x - 0.997	1.000	
B39	SKC	224-PCXR4	034637	03/01/2023	1,000	1,500	2,000	1,005	1,501	2,001	1.010x - 18.618	0.999	
B40	SKC	224-PCXR4	798439	05/01/2023	1,000	1,500	2,000	994	1,506	1,999	1.001x - 3.424	1.000	

Calibrated by :

Approved by :



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Personal Pump Calibration Report

Calibration Method : Dry Cal Primary Flowmeter

Model : Defender 510-H

S/N : 136164

Environmental Conditions

Temperature : 25 ± 3 °C
Pressure : 1010 ± 15 mmbar

Personal Pump Data				Calibration Data									
No.	Brand	Model	Serial No.	Date	Flow Rate (ml/min)						Value From Calibration Curve		
					Setting			Actual (Q std.)					
					1	2	3	1	2	3	y	R ²	
B41	SKC	224-PCXR4	612669	05/01/2023	1,000	1,500	2,000	998	1,497	1,990	0.997x + 0.718	1.000	
B42	SKC	224-PCXR4	626041	05/01/2023	1,000	1,500	2,000	1,004	1,486	1,991	0.988x + 16.291	1.000	
B43	SKC	224-PCXR4	034638	05/01/2023	1,000	1,500	2,000	1,000	1,501	1,992	0.991x + 11.882	1.000	
B44	SKC	224-PCXR8	629341	06/01/2023	1,000	1,500	2,000	1,002	1,502	2,002	1.005x - 9.213	1.000	
B45	SKC	224-PCXR8	529694	06/01/2023	1,000	1,500	2,000	999	1,501	1,989	0.991x + 11.184	1.000	
B46	SKC	224-PCXR8	566743	06/01/2023	1,000	1,500	2,000	995	1,504	2,002	1.014x - 30.571	0.999	
B47	SKC	224-PCXR8	566747	06/01/2023	1,000	1,500	2,000	1,002	1,502	2,004	1.013x - 24.601	0.999	
B48	SKC	224-PCXR8	566753	04/01/2023	1,000	1,500	2,000	1,000	1,494	1,993	0.998x + 0.319	1.000	
B49	SKC	224-PCXR8	566780	04/01/2023	1,000	1,500	2,000	1,003	1,502	2,006	1.013x - 23.962	0.999	
B50	SKC	224-PCXR8	500400	04/01/2023	1,000	1,500	2,000	1,001	1,496	2,002	1.017x - 34.237	0.999	
B51	SKC	224-PCXR8	600363	04/01/2023	1,000	1,500	2,000	996	1,504	1,999	1.011x - 25.031	0.999	
B52	SKC	224-PCXR8	093166	04/01/2023	1,000	1,500	2,000	995	1,496	1,984	0.997x - 0.602	1.000	
B53	SKC	224-PCXR8	707670	03/01/2023	1,000	1,500	2,000	1,002	1,500	2,002	1.008x - 16.403	0.999	
B54	SKC	224-PCXR3	509821	03/01/2023	1,000	1,500	2,000	993	1,502	2,001	1.017x - 34.237	0.999	
B55	SKC	224-PCXR3	510710	03/01/2023	1,000	1,500	2,000	999	1,494	1,994	0.997x - 0.869	1.000	
B56	SKC	224-PCXR3	511450	08/01/2023	1,000	1,500	2,000	1,002	1,500	2,001	1.004x - 8.061	1.000	
B57	SKC	224-PCXR3	510798	06/01/2023	1,000	1,500	2,000	997	1,492	1,998	1.000x - 2.680	1.000	
B58	SKC	224-PCXR3	509832	06/01/2023	1,000	1,500	2,000	1,000	1,498	1,999	1.007x - 18.963	0.999	
B59	SKC	224-PCXR3	509862	06/01/2023	1,000	1,500	2,000	998	1,503	1,994	0.997x + 3.235	1.000	
B60	SKC	224-PCXR3	612655	06/01/2023	1,000	1,500	2,000	1,002	1,500	2,003	1.006x - 11.407	1.000	
B61	SKC	224-PCXR3	503915	06/01/2023	1,000	1,500	2,000	994	1,489	1,988	1.004x - 12.623	1.000	
B62	SKC	224-PCXR3	506975	06/01/2023	1,000	1,500	2,000	999	1,494	1,996	0.997x - 0.343	1.000	
B63	SKC	224-PCXR3	511432	03/01/2023	1,000	1,500	2,000	991	1,501	1,999	1.016x - 34.824	0.999	
B64	SKC	224-PCXR3	505302	03/01/2023	1,000	1,500	2,000	997	1,492	1,989	0.992x - 6.226	1.000	
B65	SKC	224-PCXR3	508310	03/01/2023	1,000	1,500	2,000	1,002	1,500	2,003	1.007x - 13.938	1.000	
B66	SKC	224-PCXR3	509861	03/01/2023	1,000	1,500	2,000	1,002	1,491	1,991	0.987x + 14.183	1.000	
B67	SKC	224-PCXR3	506295	04/01/2023	1,000	1,500	2,000	993	1,506	2,004	1.009x - 15.555	1.000	
B68	SKC	224-PCXR3	506872	04/01/2023	1,000	1,500	2,000	1,002	1,490	1,987	0.995x + 3.841	1.000	
B69	SKC	224-PCXR3	506375	04/01/2023	1,000	1,500	2,000	1,002	1,499	2,000	1.010x - 20.772	0.999	
B70	SKC	224-PCXR3	510623	05/01/2023	1,000	1,500	2,000	992	1,503	1,997	1.002x - 8.855	1.000	
B71	SKC	224-PCXR3	506387	06/01/2023	1,000	1,500	2,000	992	1,506	2,002	1.017x - 34.791	0.999	
B72	SKC	224-PCXR3	506977	05/01/2023	1,000	1,500	2,000	1,001	1,498	1,993	0.991x - 5.962	1.000	
B73	SKC	224-PCXR3	512606	05/01/2023	1,000	1,500	2,000	1,002	1,501	2,005	1.003x - 14.785	1.000	
B74	SKC	224-PCXR3	605993	05/01/2023	1,000	1,500	2,000	996	1,496	1,994	1.000x - 6.916	1.000	
B75	SKC	224-PCXR3	509820	04/01/2023	1,000	1,500	2,000	995	1,496	1,990	0.996x + 1.791	1.000	
B76	SKC	224-PCXR3	509811	04/01/2023	1,000	1,500	2,000	993	1,498	1,998	1.006x - 14.322	1.000	
B77	SKC	224-PCXR3	508301	04/01/2023	1,000	1,500	2,000	1,000	1,501	2,003	1.014x - 26.603	0.999	
B78	SKC	224-PCXR3	510677	04/01/2023	1,000	1,500	2,000	995	1,503	1,999	1.013x - 28.158	0.999	
B79	SKC	224-PCXR3	610920	03/01/2023	1,000	1,500	2,000	994	1,493	1,994	0.998x - 4.184	1.000	



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Personal Pump Calibration Report

Calibration Method : Dry Cal Primary Flowmeter

Model : Defender 510-H

S/N : 136164

Environmental Conditions

Temperature : 25 \pm 3 $^{\circ}$ C
Pressure : 1010 \pm 15 mmbar

Personal Pump Data				Calibration Data								
No.	Brand	Model	Serial No.	Date	Flow Rate (ml/min)						Value From Calibration Curve	
					Setting			Actual (Q std.)				
					1	2	3	1	2	3	y	R ²
B80	SKC	224-PCXR3	504569	03/01/2023	1,000	1,500	2,000	1,002	1,499	2,002	1.012x - 24.026	0.999
B81	SKC	224-PCXR3	508480	03/01/2023	1,000	1,500	2,000	996	1,499	2,000	1.014x - 30.524	0.999
B82	SKC	224-PCXR3	505673	06/01/2023	1,000	1,500	2,000	994	1,498	1,996	1.001x - 5.943	1.000
B83	SKC	224-PCXR3	510785	06/01/2023	1,000	1,500	2,000	1,010	1,499	2,002	1.004x - 10.466	0.998
B84	SKC	224-PCXR3	508333	06/01/2023	1,000	1,500	2,000	997	1,495	1,991	0.998x + 1.260	1.000
B85	SKC	224-PCXR3	506757	08/01/2023	1,000	1,500	2,000	994	1,502	1,998	1.005x - 13.844	1.000
B86	SKC	224-PCXR3	512625	03/01/2023	1,000	1,500	2,000	1,013	1,503	2,004	1.001x - 0.726	0.999
B87	SKC	224-PCXR3	504324	03/01/2023	1,000	1,500	2,000	998	1,496	2,000	1.000x - 1.109	1.000
B88	SKC	224-PCXR3	508907	03/01/2023	1,000	1,500	2,000	996	1,498	1,994	0.998x + 1.532	1.000
B89	SKC	224-PCXR3	509860	04/01/2023	1,000	1,500	2,000	1,000	1,499	2,003	1.008x - 15.166	1.000
B90	SKC	224-PCXR3	508366	04/01/2023	1,000	1,500	2,000	993	1,506	1,999	1.006x - 12.512	1.000
B91	SKC	224-PCXR3	510919	04/01/2023	1,000	1,500	2,000	1,000	1,498	1,996	0.990x + 8.719	1.000
B92	SKC	224-PCXR3	510967	04/01/2023	1,000	1,500	2,000	1,002	1,501	1,999	1.000x + 0.299	1.000
B93	SKC	224-PCXR3	509845	04/01/2023	1,000	1,500	2,000	995	1,496	2,004	1.002x - 18.979	1.000
B94	SKC	224-PCXR8	A127871	03/01/2023	1,000	1,500	2,000	1,000	1,500	2,002	1.007x - 19.106	0.999
B95	SKC	224-PCXR8	A127921	03/01/2023	1,000	1,500	2,000	993	1,502	2,001	1.016x - 30.886	0.999
B96	SKC	224-PCXR8	A127942	03/01/2023	1,000	1,500	2,000	998	1,498	1,996	0.998x - 1.465	1.000
B97	SKC	224-PCXR8	A127955	03/01/2023	1,000	1,500	2,000	1,003	1,501	2,003	1.011x - 20.358	0.999
B98	SKC	224-PCXR8	A127956	03/01/2023	1,000	1,500	2,000	998	1,498	1,997	1.003x - 7.473	1.000

Calibrated by :

Approved by :



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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 \pm 3 $^{\circ}$ C
Pressure : 1010 \pm 15 mmbar

Personal Pump Data				Calibration Data								
No.	Brand	Model	Serial No.	Date	Flow Rate (ml/min)						Value From Calibration Curve	
					Setting			Actual (Q std.)				
					1	2	3	1	2	3	y	R ²
B01	SKC	224-PCXR4	262101	04/04/2023	1,000	1,500	2,000	994	1,498	2,003	1.005x - 7.897	1.000
B02	SKC	224-PCXR4	626166	04/04/2023	1,000	1,500	2,000	1,004	1,503	2,003	1.010x - 18.866	0.998
B03	SKC	224-PCXR4	612868	07/04/2023	1,000	1,500	2,000	995	1,496	2,001	1.007x - 13.684	1.000
B04	SKC	224-PCXR4	602804	06/04/2023	1,000	1,500	2,000	996	1,499	1,994	0.999x - 1.611	1.000
B05	SKC	224-PCXR4	612893	07/04/2023	1,000	1,500	2,000	1,002	1,501	2,004	1.014x - 24.856	0.998
B06	SKC	224-PCXR4	262166	07/04/2023	1,000	1,500	2,000	994	1,509	2,006	1.012x - 21.589	0.998
B07	SKC	224-PCXR4	626262	04/04/2023	1,000	1,500	2,000	997	1,499	1,996	0.994x - 8.454	1.000
B08	SKC	224-PCXR4	626100	04/04/2023	1,000	1,500	2,000	1,001	1,499	2,005	1.015x - 27.137	0.999
B09	SKC	224-PCXR4	626479	05/04/2023	1,000	1,500	2,000	997	1,492	1,994	0.994x - 2.385	1.000
B10	SKC	224-PCXR4	091960	03/04/2023	1,000	1,500	2,000	993	1,504	2,006	1.013x - 25.779	1.000
B11	SKC	224-PCXR8	564316	10/04/2023	1,000	1,500	2,000	985	1,492	1,995	1.002x - 7.289	1.000
B12	SKC	224-PCXR4	034656	04/04/2023	1,000	1,500	2,000	1,002	1,504	2,001	1.009x - 17.609	0.998
B13	SKC	224-PCXR4	602078	04/04/2023	1,000	1,500	2,000	997	1,501	2,000	1.004x - 7.622	1.000
B14	SKC	224-PCXR4	626313	03/04/2023	1,000	1,500	2,000	997	1,492	1,991	0.996x - 1.999	1.000
B15	SKC	224-PCXR4	626474	07/04/2023	1,000	1,500	2,000	1,003	1,503	2,006	1.013x - 23.245	0.998
B16	SKC	224-PCXR4	626477	03/04/2023	1,000	1,500	2,000	996	1,506	2,005	1.011x - 22.132	0.998
B17	SKC	224-PCXR4	626860	04/04/2023	1,000	1,500	2,000	996	1,493	1,995	1.000x - 4.627	1.000
B18	SKC	224-PCXR4	691484	04/04/2023	1,000	1,500	2,000	1,001	1,496	2,002	1.010x - 21.179	0.999
B19	SKC	224-PCXR4	691599	04/04/2023	1,000	1,500	2,000	994	1,504	2,000	1.006x - 10.498	1.000
B20	SKC	224-PCXR4	691587	03/04/2023	1,000	1,500	2,000	991	1,502	2,000	1.016x - 36.102	0.999
B21	SKC	224-PCXR4	691531	04/04/2023	1,000	1,500	2,000	994	1,501	1,995	1.001x - 5.153	1.000
B22	SKC	224-PCXR4	691654	07/04/2023	1,000	1,500	2,000	1,000	1,502	2,004	1.014x - 25.574	0.999
B23	SKC	224-PCXR4	788393	06/04/2023	1,000	1,500	2,000	990	1,508	2,004	1.013x - 23.994	1.000
B24	SKC	224-PCXR4	826388	08/04/2023	1,000	1,500	2,000	1,002	1,503	1,999	1.009x - 18.827	0.999
B25	SKC	224-PCXR4	786489	07/04/2023	1,000	1,500	2,000	1,002	1,494	2,000	0.997x - 3.494	1.000
B26	SKC	224-PCXR4	788479	07/04/2023	1,000	1,500	2,000	1,001	1,501	1,994	0.995x - 5.564	1.000
B27	SKC	224-PCXR4	691673	04/04/2023	1,000	1,500	2,000	995	1,506	2,004	1.013x - 25.091	0.999
B28	SKC	224-PCXR4	691570	04/04/2023	1,000	1,500	2,000	1,003	1,501	2,001	1.010x - 19.822	0.999
B29	SKC	224-PCXR4	626472	06/04/2023	1,000	1,500	2,000	1,001	1,498	2,000	0.999x - 1.831	1.000
B30	SKC	224-PCXR4	691489	04/04/2023	1,000	1,500	2,000	1,002	1,507	2,003	1.009x - 13.956	0.999
B31	SKC	224-PCXR4	691506	07/04/2023	1,000	1,500	2,000	994	1,496	1,997	1.004x - 6.880	1.000
B32	SKC	224-PCXR4	091567	10/04/2023	1,000	1,500	2,000	992	1,506	2,001	1.013x - 25.542	0.999
B33	SKC	224-PCXR4	091756	06/04/2023	1,000	1,500	2,000	993	1,498	1,992	0.995x - 1.121	1.000
B34	SKC	224-PCXR4	612982	07/04/2023	1,000	1,500	2,000	1,002	1,503	2,003	1.008x - 14.753	0.998
B35	SKC	224-PCXR4	602882	06/04/2023	1,000	1,500	2,000	991	1,497	1,996	1.003x - 11.698	1.000
B36	SKC	224-PCXR4	626164	06/04/2023	1,000	1,500	2,000	997	1,495	1,998	1.002x - 6.097	1.000
B37	SKC	224-PCXR4	626256	07/04/2023	1,000	1,500	2,000	993	1,505	1,996	1.012x - 27.161	0.998
B38	SKC	224-PCXR4	626187	07/04/2023	1,000	1,500	2,000	998	1,493	1,997	1.003x - 8.615	1.000
B39	SKC	224-PCXR4	034637	10/04/2023	1,000	1,500	2,000	1,002	1,500	2,003	1.013x - 23.125	0.999
B40	SKC	224-PCXR4	786349	07/04/2023	1,000	1,500	2,000	993	1,507	1,998	1.015x - 30.204	0.999

Calibrated by :

Approved by :



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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 \pm 3 $^{\circ}$ C
Pressure : 1010 \pm 15 mmbar

Personal Pump Data					Calibration Data									
No.	Brand	Model	Serial No.	Date	Flow Rate (ml/min)						Value From Calibration Curve			
					Setting			Actual (Q std.)						
					1	2	3	1	2	3	y	R ²		
B41	SKC	224-PCXR4	612669	07/04/2023	1,000	1,500	2,000	997	1,496	1,991	0.998x - 1.396	1.000		
B42	SKC	224-PCXR4	626041	10/04/2023	1,500	1,500	2,000	1,006	1,496	1,992	0.956x + 14.223	1.000		
B43	SKC	224-PCXR4	034636	07/04/2023	1,000	1,500	2,000	1,001	1,503	1,998	0.992x + 8.810	1.000		
B44	SKC	224-PCXR8	629341	10/04/2023	1,000	1,500	2,000	1,000	1,499	2,005	1.005x - 14.358	1.000		
B45	SKC	224-PCXR8	629594	10/04/2023	1,000	1,500	2,000	998	1,506	1,987	0.990x + 12.560	1.000		
B46	SKC	224-PCXR8	666743	05/04/2023	1,000	1,500	2,000	996	1,502	2,000	1.012x - 26.302	0.999		
B47	SKC	224-PCXR8	666747	07/04/2023	1,000	1,500	2,000	998	1,501	2,002	1.014x - 27.552	0.999		
B48	SKC	224-PCXR8	666753	10/04/2023	1,000	1,500	2,000	998	1,493	1,996	0.957x - 0.359	1.000		
B49	SKC	224-PCXR8	666780	05/04/2023	1,000	1,500	2,000	1,007	1,501	2,007	1.011x - 19.156	0.999		
B50	SKC	224-PCXR8	600400	07/04/2023	1,000	1,500	2,000	1,004	1,495	2,004	1.000x - 1.663	1.000		
B51	SKC	224-PCXR8	600383	04/04/2023	1,000	1,500	2,000	997	1,502	1,998	1.006x - 21.322	0.999		
B52	SKC	224-PCXR8	095186	05/04/2023	1,000	1,500	2,000	993	1,493	1,995	1.000x - 6.106	1.000		
B53	SKC	224-PCXR8	707670	06/04/2023	1,000	1,500	2,000	1,000	1,498	2,002	1.009x - 18.863	0.999		
B54	SKC	224-PCXR3	509821	05/04/2023	1,000	1,500	2,000	995	1,500	2,001	1.016x - 37.482	0.999		
B55	SKC	224-PCXR3	510710	10/04/2023	1,000	1,500	2,000	996	1,497	1,992	0.996x - 0.131	1.000		
B56	SKC	224-PCXR3	511450	05/04/2023	1,000	1,500	2,000	1,008	1,501	2,003	1.005x - 8.081	1.000		
B57	SKC	224-PCXR3	510798	06/04/2023	1,000	1,500	2,000	999	1,480	2,000	1.001x - 2.920	1.000		
B58	SKC	224-PCXR3	509852	10/04/2023	1,000	1,500	2,000	1,002	1,496	1,998	1.004x - 15.922	0.999		
B59	SKC	224-PCXR3	500862	10/04/2023	1,000	1,500	2,000	998	1,501	1,996	0.956x + 4.471	1.000		
B60	SKC	224-PCXR3	512655	07/04/2023	1,000	1,500	2,000	1,003	1,499	2,004	1.005x - 9.971	1.000		
B61	SKC	224-PCXR3	503915	10/04/2023	1,000	1,500	2,000	993	1,466	1,999	1.007x - 15.834	1.000		
B62	SKC	224-PCXR3	505375	10/04/2023	1,000	1,500	2,000	1,001	1,495	1,997	1.000x - 4.802	1.000		
B63	SKC	224-PCXR3	511432	07/04/2023	1,000	1,500	2,000	993	1,500	2,000	1.015x - 32.709	0.999		
B64	SKC	224-PCXR3	508302	05/04/2023	1,000	1,500	2,000	998	1,491	1,987	0.989x + 2.655	1.000		
B65	SKC	224-PCXR3	608310	10/04/2023	1,000	1,500	2,000	995	1,502	2,005	1.012x - 20.506	1.000		
B66	SKC	224-PCXR3	509561	10/04/2023	1,000	1,500	2,000	1,000	1,492	1,992	0.980x - 10.812	1.000		
B67	SKC	224-PCXR3	506295	07/04/2023	1,000	1,500	2,000	993	1,508	2,002	1.007x - 13.999	1.000		
B68	SKC	224-PCXR3	505872	05/04/2023	1,000	1,500	2,000	998	1,488	1,997	0.998x - 1.743	1.000		
B69	SKC	224-PCXR3	505375	04/04/2023	1,000	1,500	2,000	1,004	1,502	2,002	1.009x - 16.897	0.999		
B70	SKC	224-PCXR3	510623	05/04/2023	1,000	1,500	2,000	994	1,505	1,986	1.004x - 8.646	1.000		
B71	SKC	224-PCXR3	506067	10/04/2023	1,000	1,500	2,000	994	1,506	2,003	1.011x - 23.544	0.999		
B72	SKC	224-PCXR3	505977	10/04/2023	1,000	1,500	2,000	1,005	1,483	1,992	0.988x + 13.309	1.000		
B73	SKC	224-PCXR3	512606	05/04/2023	1,000	1,500	2,000	1,000	1,504	2,004	1.008x - 14.506	1.000		
B74	SKC	224-PCXR3	505983	05/04/2023	1,000	1,500	2,000	997	1,497	1,998	1.001x - 7.514	1.000		
B75	SKC	224-PCXR3	509820	07/04/2023	1,000	1,500	2,000	997	1,496	1,992	0.997x + 0.195	1.000		
B76	SKC	224-PCXR3	509811	05/04/2023	1,000	1,500	2,000	995	1,498	1,999	1.004x - 11.212	1.000		
B77	SKC	224-PCXR3	508301	10/04/2023	1,000	1,500	2,000	1,003	1,502	2,004	1.012x - 23.811	0.999		
B78	SKC	224-PCXR3	510577	04/04/2023	1,000	1,500	2,000	997	1,505	2,000	1.007x - 16.113	0.999		
B79	SKC	224-PCXR3	510920	10/04/2023	1,000	1,500	2,000	996	1,495	1,993	0.998x - 1.522	1.000		

Calibrated by :

Approved by :



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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 \pm 3 $^{\circ}$ C
Pressure : 1010 \pm 15 mmbar

Personal Pump Data					Calibration Data									
No.	Brand	Model	Serial No.	Date	Flow Rate (ml/min)						Value From Calibration Curve			
					Setting			Actual (Q std.)						
					1	2	3	1	2	3	y	R ²		
B80	SKC	224-PCXR3	504569	05/04/2023	1,000	1,500	2,000	1,003	1,498	2,003	1.011x - 22.431	0.999		
B81	SKC	224-PCXR3	503460	06/04/2023	1,000	1,500	2,000	995	1,500	2,001	1.016x - 32.797	0.999		
B82	SKC	224-PCXR3	505673	05/04/2023	1,000	1,500	2,000	995	1,496	1,997	1.003x - 7.230	1.000		
B83	SKC	224-PCXR3	510785	06/04/2023	1,000	1,500	2,000	1,007	1,498	2,001	1.006x - 13.816	0.999		
B84	SKC	224-PCXR3	508333	10/04/2023	1,000	1,500	2,000	995	1,498	1,993	0.998x - 1.870	1.000		
B85	SKC	224-PCXR3	505767	10/04/2023	1,000	1,500	2,000	998	1,500	2,000	1.004x - 12.009	1.000		
B86	SKC	224-PCXR3	512825	05/04/2023	1,000	1,500	2,000	1,011	1,501	2,005	1.002x - 3.877	0.999		
B87	SKC	224-PCXR3	504324	05/04/2023	1,000	1,500	2,000	999	1,496	1,998	0.999x + 0.606	1.000		
B88	SKC	224-PCXR3	508307	05/04/2023	1,000	1,500	2,000	997	1,497	1,992	0.994x + 4.682	1.000		
B89	SKC	224-PCXR3	509860	05/04/2023	1,000	1,500	2,000	1,001	1,498	2,002	1.007x - 13.32	1.000		
B90	SKC	224-PCXR3	508366	05/04/2023	1,000	1,500	2,000	995	1,507	1,998	1.004x - 9.840	1.000		
B91	SKC	224-PCXR3	510919	04/04/2023	1,000	1,500	2,000	1,003	1,500	1,995	0.988x + 13.505	1.000		
B92	SKC	224-PCXR3	510987	05/04/2023	1,000	1,500	2,000	1,003	1,503	1,995	0.997x + 5.125	1.000		
B93	SKC	224-PCXR3	509845	10/04/2023	1,000	1,500	2,000	996	1,498	2,005	1.007x - 13.628	1.000		
B94	SKC	224-PCXR8	A127871	04/04/2023	1,000	1,500	2,000	1,001	1,495	2,005	1.006x - 15.746	0.998		
B95	SKC	224-PCXR8	A127921	03/04/2023	1,000	1,500	2,000	995	1,504	2,001	1.013x - 26.112	0.999		
B96	SKC	224-PCXR8	A127942	07/04/2023	1,000	1,500	2,000	999	1,499	1,997	1.000x - 2.010	1.000		
B97	SKC	224-PCXR8	A127955	07/04/2023	1,000	1,500	2,000	1,006	1,508	2,005	1.011x - 18.638	0.999		
B98	SKC	224-PCXR8	A127966	07/04/2023	1,000	1,500	2,000	994	1,497	1,996	1.005x - 11.436	1.000		

Calibrated by :

Approved by :



มูลนิธิวิทยาศาสตร์แห่งชาติ

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Rotameter Calibration Report (For Personal Pump Low Flow Adjust)											
Calibration Method : Dry Cal Primary Flowmeter				Model : Defender 510-W				S/N : 136164			
Rotameter Data			Calibration Data								
No.	Brand	Model	Date	Flow Rate (ml/min)						Value From Calibration Curve	
				Flow Rate (Reading)			Actual (Q std.)				
				1	2	3	1	2	3	y	R ²
L-B01	Dwyer	VFA-21	05/04/2023	50	100	200	50.3	98.7	198.9	0.968x + 0.859	1.000
L-B02	Dwyer	VFA-21	04/04/2023	50	100	200	50.8	99.8	198.3	0.995x + 0.958	0.999
L-B03	Dwyer	VFA-21	07/04/2023	50	100	200	50.4	99.6	197.9	1.009x - 1.360	1.000
L-B04	Dwyer	VFA-21	07/04/2023	50	100	200	49.5	102.0	200.7	1.012x - 0.457	1.000
L-B05	Dwyer	VFA-21	07/04/2023	50	100	200	50.9	98.9	201.2	0.998x + 1.040	0.996
L-B06	Dwyer	VFA-21	07/04/2023	50	100	200	50.8	99.7	202.8	1.009x + 0.150	1.000
L-B07	Dwyer	VFA-21	04/04/2023	50	100	200	49.0	101.2	200.5	1.014x - 1.381	1.000
L-B08	Dwyer	VFA-21	05/04/2023	50	100	200	50.2	102.1	197.7	0.967x + 0.307	1.000
L-B09	Dwyer	VFA-21	07/04/2023	50	100	200	50.8	99.6	201.1	0.990x + 2.095	0.998
L-B10	Dwyer	VFA-21	10/04/2023	50	100	200	51.0	99.0	203.2	1.006x + 0.463	1.000
Calibrated by :				Approved by :							



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Calibration Report					
Non-Dispersive Infrared CO Analyzer					
Date :	04 January 2023	Brand :	API	Model :	300E
No.	CO-B01	Serial No.	782		
Calibrator (Dilution System)					
Brand :	API	Model :	700		
Last Cal. Date :	08 September 2022	Serial No. :	421		
Reference Standard Gas					
Standard Gas :	Carbon Monoxide (CO)	Cylinder No. :	D196045		
Certified Date :	16 April 2022	Expired Date :	15 April 2024	Cylinder Conc. :	4,570 ppm
Calibrating Condition					
Pressure	1011 mmbar	Temp.	24.5 °C	% RH	50
Calibration Setting					
Span	Initial Reading (Before Adj.), PPM			Final Reading (After Adj.), PPM	
Set Point	Expected Concentration	Analyzer Response	%Diff	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	4016.5	mV	2500-4600 mV		
CO Reference	3948.7	mV	2500-4600 mV		
Measure/Reference Ratio	1.180	-	1.1-1.3 W/Zero Air		
Sample Pressure	28.7	In-Hg-A	~2" < Ambient Absolute Pressure		
Sample Flow	808	CC/Min	800 ± 10%		
Sample Temperature	48.3	°C	48 ± 4		
Bench Temperature	48.2	°C	48 ± 2		
Wheel Temperature	68.4	°C	68 ± 2		
Box Temperature	30.9	°C	Ambient Temp + 7 ± 10		
Photo-Drive	3021.7	mV	250 mV to 4750 mV		
Slope	1.017	-	1.0 ± 0.3		
Offset	0.2	-	0 ± 0.3		

Calibrated by :

Approved by :



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Calibration Report					
Non-Dispersive Infrared CO Analyzer					
Date :	04 January 2023	Brand :	API	Model :	300E
No.	CO-B02	Serial No.	965		
Calibrator (Dilution System)					
Brand :	API	Model :	700		
Last Cal. Date :	06 September 2022	Serial No. :	421		
Reference Standard Gas					
Standard Gas :	Carbon Monoxide (CO)	Cylinder No. :	D196045		
Certified Date :	16 April 2022	Expired Date :	15 April 2024	Cylinder Conc. :	4,570 ppm
Calibrating Condition					
Pressure	1011 mmbar	Temp.	24.5 °C	% RH	50
Calibration Setting					
Span	Initial Reading (Before Adj.), PPM			Final Reading (After Adj.), PPM	
Set Point	Expected Concentration	Analyzer Response	%Diff	Analyzer Response	
Zero	0	0.11	-	0	
CO Span	40.00	40.06	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	4017.7	mV	2500-4800 mV		
CO Reference	3949.2	mV	2500-4800 mV		
Measure/Reference Ratio	1.180	-	1.1-1.3 W/Zero Air		
Sample Pressure	28.4	In-Hg-A	~2" < Ambient Absolute Pressure		
Sample Flow	810	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	3018.5	mV	250 mV to 4750 mV		
Slope	1.017	-	1.0 ± 0.3		
Offset	0.2	-	0 ± 0.3		

Calibrated by :

Approved by :



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Calibration Report					
Non-Dispersive Infrared CO Analyzer					
Date :	01 February 2023	Brand :	API	Model :	300E
No.	CO-B01	Serial No.	782		
Calibrator (Dilution System)					
Brand :	API	Model :	700		
Last Cal. Date :	06 September 2022	Serial No. :	421		
Reference Standard Gas					
Standard Gas :	Carbon Monoxide (CO)	Cylinder No. :	D196045		
Certified Date :	16 April 2022	Expired Date :	16 April 2024	Cylinder Conc. :	4,570 ppm
Calibrating Condition					
Pressure	1011	mmbar	Temp.	24.5	°C
			% RH	46	
Calibration Setting					
Span	Initial Reading (Before Adj.), PPM			Final Reading (After Adj.), PPM	
Set Point	Expected Concentration	Analyzer Response	%Diff	Analyzer Response	
Zero	0	-0.10	-	0	
CO Span	40.00	39.92	-0.200	40.00	
API Model 300E CO Analyzer Check List					
Parameter	Observed Value	Units	Nominal Range		
Range	50	PPM	0-1000 ppm		
Stability	0.10	PPM	< 1 ppm With Zero Air		
CO Measure	4015.7	mV	2500-4500 mV		
CO Reference	3948.2	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	809	CC/Min	800 ± 10%		
Sample Temperature	48.4	°C	48 ± 4		
Bench Temperature	48.1	°C	48 ± 2		
Wheel Temperature	68.3	°C	68 ± 2		
Box Temperature	30.6	°C	Ambient Temp + 7 ± 10		
Photo-Drive	3025.2	mV	250 mV to 4750 mV		
Slope	1.017	-	1.0 ± 0.3		
Offset	0.2	-	0 ± 0.3		

Calibrated by :

Approved by :



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Calibration Report					
Non-Dispersive Infrared CO Analyzer					
Date :	02 February 2023	Brand :	API	Model :	300E
No.	CO-B02	Serial No.	965		
Calibrator (Dilution System)					
Brand :	API	Model :	700		
Last Cal. Date :	06 September 2022	Serial No. :	421		
Reference Standard Gas					
Standard Gas :	Carbon Monoxide (CO)	Cylinder No. :	D196045		
Certified Date :	16 April 2022	Expired Date :	16 April 2024	Cylinder Conc. :	4,570 ppm
Calibrating Condition					
Pressure	1011	mmbar	Temp.	24.5	°C
			% RH	48	
Calibration Setting					
Span	Initial Reading (Before Adj.), PPM			Final Reading (After Adj.), PPM	
Set Point	Expected Concentration	Analyzer Response	%Diff	Analyzer Response	
Zero	0	-0.10	-	0	
CO Span	40.00	39.94	-0.150	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	4018.6	mV	2500-4500 mV		
CO Reference	3949.6	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	813	CC/Min	800 ± 10%		
Sample Temperature	48.6	°C	48 ± 4		
Bench Temperature	48.2	°C	48 ± 2		
Wheel Temperature	68.4	°C	68 ± 2		
Box Temperature	30.8	°C	Ambient Temp + 7 ± 10		
Photo-Drive	3022.7	mV	250 mV to 4750 mV		
Slope	1.017	-	1.0 ± 0.3		
Offset	0.2	-	0 ± 0.3		

Calibrated by :

Approved by :

Calibration Report				
Non-Dispersive Infrared CO Analyzer				
Date :	03 March 2023	Brand :	API	Model :
No.	CO-B01	Serial No.	782	
Calibrator (Dilution System)				
Brand :	API	Model :	700	
Last Cal. Date :	06 September 2022	Serial No. :	421	
Reference Standard Gas				
Standard Gas :	Carbon Monoxide (CO)	Cylinder No. :	D196045	
Certified Date :	16 April 2022	Expired Date :	15 April 2024	Cylinder Conc. :
Calibrating Condition				
Pressure	1011 mmbar	Temp.	24.6 °C	% RH
Calibration Setting				
Span	Initial Reading (Before Adj.), PPM			Final Reading (After Adj.), PPM
Set Point	Expected Concentration	Analyzer Response	%Diff	Analyzer Response
Zero	0	-0.10	-	0
CO Span	40.00	39.94	-0.150	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	4016.4	mV	2500-4800 mV	
CO Reference	3948.6	mV	2500-4800 mV	
Measure/Reference Ratio	1.160	-	1.1-1.3 W/Zero Air	
Sample Pressure	28.7	In-Hg-A	~2" < Ambient Absolute Pressure	
Sample Flow	807	CC/Min	800 ± 10%	
Sample Temperature	48.5	°C	48 ± 4	
Beach Temperature	48.0	°C	48 ± 2	
Wheel Temperature	68.2	°C	68 ± 2	
Box Temperature	30.7	°C	Ambient Temp + 7 ± 10	
Photo-Drive	3024.1	mV	250 mV to 4750 mV	
Slope	1.017	-	1.0 ± 0.3	
Offset	0.2	-	0 ± 0.3	

Calibrated by : 

Approved by : 

Calibration Report				
Non-Dispersive Infrared CO Analyzer				
Date :	01 March 2023	Brand :	API	Model :
No.	CO-B02	Serial No.	965	
Calibrator (Dilution System)				
Brand :	API	Model :	700	
Last Cal. Date :	06 September 2022	Serial No. :	421	
Reference Standard Gas				
Standard Gas :	Carbon Monoxide (CO)	Cylinder No. :	D196045	
Certified Date :	16 April 2022	Expired Date :	15 April 2024	Cylinder Conc. :
Calibrating Condition				
Pressure	1011 mmbar	Temp.	24.6 °C	% RH
Calibration Setting				
Span	Initial Reading (Before Adj.), PPM			Final Reading (After Adj.), PPM
Set Point	Expected Concentration	Analyzer Response	%Diff	Analyzer Response
Zero	0	0.10	-	0
CO Span	40.00	39.96	-0.100	40.00
API Model 300E CO Analyzer Check List				
Parameter	Observed Value	Units	Nominal Range	
Range	50	PPM	0-1000 ppm	
Stability	0.10	PPM	< 1 ppm With Zero Air	
CO Measure	4015.1	mV	2500-4800 mV	
CO Reference	3949.3	mV	2500-4800 mV	
Measure/Reference Ratio	1.179	-	1.1-1.3 W/Zero Air	
Sample Pressure	28.4	In-Hg-A	~2" < Ambient Absolute Pressure	
Sample Flow	811	CC/Min	800 ± 10%	
Sample Temperature	48.2	°C	48 ± 4	
Beach Temperature	48.0	°C	48 ± 2	
Wheel Temperature	68.3	°C	68 ± 2	
Box Temperature	30.6	°C	Ambient Temp + 7 ± 10	
Photo-Drive	3020.5	mV	250 mV to 4750 mV	
Slope	1.017	-	1.0 ± 0.3	
Offset	0.2	-	0 ± 0.3	

Calibrated by : 

Approved by : 

Calibration Report				
Non-Dispersive Infrared CO Analyzer				
Date :	05 April 2023	Brand :	API	Model :
No.	CO-B01	Serial No.	783	
Calibrator (Dilution System)				
Brand :	API	Model :	700	
Last Cal. Date :	06 September 2022	Serial No. :	421	
Reference Standard Gas				
Standard Gas :	Carbon Monoxide (CO)	Cylinder No. :	D196045	
Certified Date :	16 April 2022	Expired Date :	15 April 2024	Cylinder Conc. :
Calibrating Condition				
Pressure	1011	mmbar	Temp.	24.6 °C
Calibration Setting				
Span	Initial Reading (Before Adj.), PPM			Final Reading (After Adj.), PPM
Set Point	Expected Concentration	Analyzer Response	%Diff	Analyzer Response
Zero	0	0.10	-	0
CO Span	40.00	39.32	-0.200	40.00
API Model 300E CO Analyzer Check List				
Parameter	Observed Value	Units	Nominal Range	
Range	50	PPM	0-1000 ppm	
Stability	0.10	PPM	< 1 ppm With Zero Air	
CO Measure	4015.7	mV	2500-4800 mV	
CO Reference	3948.5	mV	2500-4800 mV	
Measure/Reference Ratio	1.180	-	1.1-1.3 W/Zero Air	
Sample Pressure	26.5	In-Hg-A	-2" < Ambient Absolute Pressure	
Sample Flow	504	CC/Min	500 ± 10%	
Sample Temperature	48.8	°C	48 ± 4	
Bench Temperature	48.1	°C	48 ± 2	
Wheel Temperature	68.3	°C	68 ± 2	
Box Temperature	30.6	°C	Ambient Temp + 7 ± 10	
Photo-Drive	3029.3	mV	250 mV to 4750 mV	
Slope	1.017	-	1.0 ± 0.3	
Offset	0.2	-	0 ± 0.3	

Calibrated by :

Approved by :

Calibration Report				
Non-Dispersive Infrared CO Analyzer				
Date :	07 April 2023	Brand :	API	Model :
No.	CO-B02	Serial No.	965	
Calibrator (Dilution System)				
Brand :	API	Model :	700	
Last Cal. Date :	06 September 2022	Serial No. :	421	
Reference Standard Gas				
Standard Gas :	Carbon Monoxide (CO)	Cylinder No. :	D196045	
Certified Date :	16 April 2022	Expired Date :	15 April 2024	Cylinder Conc. :
Calibrating Condition				
Pressure	1011	mmbar	Temp.	24.6 °C
Calibration Setting				
Span	Initial Reading (Before Adj.), PPM			Final Reading (After Adj.), PPM
Set Point	Expected Concentration	Analyzer Response	%Diff	Analyzer Response
Zero	0	0.11	-	0
CO Span	40.00	40.04	0.100	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	4016.1	mV	2500-4800 mV	
CO Reference	3948.9	mV	2500-4800 mV	
Measure/Reference Ratio	1.180	-	1.1-1.3 W/Zero Air	
Sample Pressure	26.6	In-Hg-A	-2" < Ambient Absolute Pressure	
Sample Flow	514	CC/Min	500 ± 10%	
Sample Temperature	48.5	°C	48 ± 4	
Bench Temperature	48.2	°C	48 ± 2	
Wheel Temperature	68.4	°C	68 ± 2	
Box Temperature	30.8	°C	Ambient Temp + 7 ± 10	
Photo-Drive	3025.1	mV	250 mV to 4750 mV	
Slope	1.017	-	1.0 ± 0.3	
Offset	0.2	-	0 ± 0.3	

Calibrated by :

Approved by :



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Calibration Report					
Non-Dispersive Infrared CO Analyzer					
Date :	02 May 2023	Brand :	API	Model :	300E
No.	CO-B01	Serial No.	782		
Calibrator (Dilution System)					
Brand :	API	Model :	700		
Last Cal. Date :	06 September 2022	Serial No.	421		
Reference Standard Gas					
Standard Gas :	Carbon Monoxide (CO)	Cylinder No. :	D196045		
Certified Date :	16 April 2022	Expired Date :	15 April 2024	Cylinder Conc. :	4,570 ppm
Calibrating Condition					
Pressure	1011 mmbar	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	%Diff	Analyzer Response	
Zero	0	0.11	-	0	
CO Span	40.00	39.89	-0.275	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	4018.5	mV	2500-4800 mV		
CO Reference	3949.1	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	803	CC/Min	800 ± 10%		
Sample Temperature	48.3	°C	48 ± 4		
Bench Temperature	48.0	°C	48 ± 2		
Wheel Temperature	68.2	°C	68 ± 2		
Box Temperature	30.8	°C	Ambient Temp + 7 ± 10		
Photo-Drive	3031.6	mV	250 mV to 4750 mV		
Slope	1.017	-	1.0 ± 0.3		
Offset	0.2	-	0 ± 0.3		

Calibrated by :



Approved by :



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Calibration Report					
Non-Dispersive Infrared CO Analyzer					
Date :	02 May 2023	Brand :	API	Model :	300E
No.	CO-B02	Serial No.	965		
Calibrator (Dilution System)					
Brand :	API	Model :	700		
Last Cal. Date :	06 September 2022	Serial No.	421		
Reference Standard Gas					
Standard Gas :	Carbon Monoxide (CO)	Cylinder No. :	D196045		
Certified Date :	16 April 2022	Expired Date :	15 April 2024	Cylinder Conc. :	4,570 ppm
Calibrating Condition					
Pressure	1011 mmbar	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	%Diff	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	4017.1	mV	2500-4800 mV		
CO Reference	3949.4	mV	2500-4800 mV		
Measure/Reference Ratio	1.180	-	1.1-1.3 W/Zero Air		
Sample Pressure	28.7	In-Hg-A	-2" < Ambient Absolute Pressure		
Sample Flow	812	CC/Min	800 ± 10%		
Sample Temperature	48.3	°C	48 ± 4		
Bench Temperature	48.1	°C	48 ± 2		
Wheel Temperature	68.2	°C	68 ± 2		
Box Temperature	30.6	°C	Ambient Temp + 7 ± 10		
Photo-Drive	3023.8	mV	250 mV to 4750 mV		
Slope	1.017	-	1.0 ± 0.3		
Offset	0.2	-	0 ± 0.3		

Calibrated by :



Approved by :



Calibration Report Total Hydrocarbon Analyzer			
Date : 04 January 2023		Brand : HORIBA	Model : APHA-360CE
No. B01		Serial No. 4211954001	
Calibrator (Dilution System)			
Brand : API		Model : 700	
Last Cal. Date : 04 August 2022		Serial No. : 911	
Reference Standard Gas			
Standard Gas : Methane (CH ₄)		Cylinder No. : D595075	
Certified Date : 17 March 2015	Expired Date : 17 March 2023	Cylinder Conc. : 456 ppm	
Calibrating Condition			
Pressure : 1011 mmbar	Temp. : 24.5 °C	% RH : 49	
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 (Before Adj)		Final Reading (After Adj)
	Expected Concentration (PPM)	Analyzer Response (PPM)	Analyzer Response (PPM)
Zero	0	0.11	0
Span	10	10.05	10
Calibration Setting (Final)			
Span Instrument Gain : 0.995		Finish Time : 2:00 PM	
APIA-360 Total Hydrocarbon Analyzer			
Test Values	Observed Value	Units	Nominal Range
Signal (CH ₄)	911.9	mV	800 - 1,350
Signal (THC)	916.2	mV	800 - 1,350
Detector	77.9	kPa	((Pressure Air/1013)x100)-20 ± 4 kPa
Purifier	19.2	kPa	8 - 25
NMC	258.7	°C	260 ± 10
Bypass	0.9	L / min	0.9 ± 0.3
Over Flow	0.8	L / Min	0.8

Calibrated by :

Approved by :

Calibration Report Total Hydrocarbon Analyzer			
Date : 04 January 2023		Brand : HORIBA	Model : APHA-370
No. R01		Serial No. WDDN38N	
Calibrator (Dilution System)			
Brand : API		Model : 700	
Last Cal. Date : 04 August 2022		Serial No. : 911	
Reference Standard Gas			
Standard Gas : Methane (CH ₄)		Cylinder No. : D595075	
Certified Date : 17 March 2015	Expired Date : 17 March 2023	Cylinder Conc. : 456 ppm	
Calibrating Condition			
Pressure : 1011 mmbar	Temp. : 24.5 °C	% RH : 49	
Start Time : 3:00 PM			
Pre-Calibration Checks			
Change Particulate Filter : Yes		Station Temp : 25.0 °C	
Leak Test : Yes			
Calibration Setting			
Span Set Point	Initial Reading (Before Adj)		Final Reading (After Adj)
	Expected Concentration (PPM)	Analyzer Response (PPM)	Analyzer Response (PPM)
Zero	0	0.10	0
Span	10	10.02	10
Calibration Setting (Final)			
Span Instrument Gain : 0.998		Finish Time : 4:00 PM	
APIA-360 Total Hydrocarbon Analyzer			
Test Values	Observed Value	Units	Nominal Range
Signal (CH ₄)	912.2	mV	800 - 1,350
Signal (THC)	917.6	mV	800 - 1,350
Detector	77.8	kPa	((Pressure Air/1013)x100)-20 ± 4 kPa
Purifier	19.0	kPa	8 - 25
NMC	259.7	°C	260 ± 10
Bypass	0.9	L / min	0.9 ± 0.3
Over Flow	0.8	L / Min	0.8

Calibrated by :

Approved by :



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Tel : (662) 939-4370-72, Fax : (662) 513-4221, E-mail : sse@spscon.com, www.spscon.com

Calibration Report Total Hydrocarbon Analyzer			
Date :	02 February 2023	Brand :	HORIBA
		Model :	APHA-360CE
No.	B01	Serial No.	4211954001
Calibrator (Dilution System)			
Brand :	API	Model :	700
Last Cal. Date :	04 August 2022	Serial No. :	911
Reference Standard Gas			
Standard Gas :	Methane (CH ₄)	Cylinder No. :	D595076
Certified Date :	17 March 2015	Expired Date :	17 March 2023
		Cylinder Conc. :	456 ppm
Calibrating Condition			
Pressure	1011 mmbar	Temp.	24.5 °C
		% RH	49
		Start Time :	9:00 AM
Pre-Calibration Checks			
Change Particulate Filter	Yes	Station Temp :	25.0 °C
Leak Test	Yes		
Calibration Setting			
Span Set Point	Initial Reading (Before Adj)		Final Reading (After Adj)
	Expected Concentration (PPM)	Analyzer Response (PPM)	Analyzer Response (PPM)
Zero	0	-0.10	0
Span	10	10.04	10
Calibration Setting (Final)			
Span Instrument Gain:	0.997	Finish Time:	10:00 AM
APIHA-360 Total Hydrocarbon Analyzer			
Test Values	Observed Value	Units	Nominal Range
Signal (CH ₄)	911.4	mV	800-1,350
Signal (THC)	916.6	mV	800-1,350
Detector	77.8	kPa	((Pressure Air/1013)x100)-20 ± 4 kPa
Purifier	19.0	kPa	8 - 25
NMC	259.1	°C	260 ± 10
Bypass	0.9	L / min	0.9 ± 0.3
Over Flow	0.8	L / Min	0.8

Calibrated by :

Approved by :



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Calibration Report Total Hydrocarbon Analyzer			
Date :	01 February 2023	Brand :	HORIBA
		Model :	APHA-370
No.	R01	Serial No.	WDDDN38N
Calibrator (Dilution System)			
Brand :	API	Model :	700
Last Cal. Date :	04 August 2022	Serial No. :	911
Reference Standard Gas			
Standard Gas :	Methane (CH ₄)	Cylinder No. :	D595076
Certified Date :	17 March 2015	Expired Date :	17 March 2023
		Cylinder Conc. :	456 ppm
Calibrating Condition			
Pressure	1011 mmbar	Temp.	24.6 °C
		% RH	48
		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 (Before Adj)		Final Reading (After Adj)
	Expected Concentration (PPM)	Analyzer Response (PPM)	Analyzer Response (PPM)
Zero	0	0.11	0
Span	10	10.05	10
Calibration Setting (Final)			
Span Instrument Gain:	0.996	Finish Time:	2:00 PM
APIHA-360 Total Hydrocarbon Analyzer			
Test Values	Observed Value	Units	Nominal Range
Signal (CH ₄)	911.7	mV	800-1,350
Signal (THC)	917.1	mV	800-1,350
Detector	77.9	kPa	((Pressure Air/1013)x100)-20 ± 4 kPa
Purifier	19.2	kPa	8 - 25
NMC	259.4	°C	260 ± 10
Bypass	0.9	L / min	0.9 ± 0.3
Over Flow	0.8	L / Min	0.8

Calibrated by :

Approved by :

Calibration Report Total Hydrocarbon Analyzer			
Date : 02 March 2023		Brand : HORIBA	Model : APHA-360CE
No. B01		Serial No. 4211954001	
Calibrator (Dilution System)			
Brand : API		Model : 700	
Last Cal. Date : 04 August 2022		Serial No. : 911	
Reference Standard Gas			
Standard Gas : Methane (CH ₄)		Cylinder No. : D595075	
Certified Date : 17 March 2016	Expired Date : 17 March 2023	Cylinder Conc. : 456 ppm	
Calibrating Condition			
Pressure : 1011 mmbar	Temp. : 24.5 °C	% RH : 49	
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 (Before Adj)		Final Reading (After Adj)
	Expected Concentration (PPM)	Analyzer Response (PPM)	Analyzer Response (PPM)
Zero	0	0.10	0
Span	10	10.06	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)	912.1	mV	800-1,350
Signal (THC)	917.4	mV	800-1,350
Detector	78.0	kPa	((Pressure Air/1013)x100) - 20 ± 4 kPa
Purifier	19.2	kPa	8 - 25
NMC	258.9	°C	260 ± 10
Bypass	0.9	L / min	0.9 ± 0.3
Over Flow	0.8	L / Min	0.8

Calibrated by :

Approved by :

Calibration Report Total Hydrocarbon Analyzer			
Date : 02 March 2023		Brand : HORIBA	Model : APHA-370
No. R01		Serial No. WDDDN38N	
Calibrator (Dilution System)			
Brand : API		Model : 700	
Last Cal. Date : 04 August 2022		Serial No. : 911	
Reference Standard Gas			
Standard Gas : Methane (CH ₄)		Cylinder No. : D595075	
Certified Date : 17 March 2016	Expired Date : 17 March 2023	Cylinder Conc. : 456 ppm	
Calibrating Condition			
Pressure : 1011 mmbar	Temp. : 24.5 °C	% RH : 49	
Start Time : 9:00 AM			
Pre-Calibration Checks			
Change Particulate Filter : Yes		Station Temp : 25.0 °C	
Leak Test : Yes			
Calibration Setting			
Span Set Point	Initial Reading (Before Adj)		Final Reading (After Adj)
	Expected Concentration (PPM)	Analyzer Response (PPM)	Analyzer Response (PPM)
Zero	0	-0.10	0
Span	10	10.04	10
Calibration Setting (Final)			
Span Instrument Gain : 0.996		Finish Time : 10:00 AM	
APHA-360 Total Hydrocarbon Analyzer			
Test Values	Observed Value	Units	Nominal Range
Signal (CH ₄)	911.8	mV	800-1,350
Signal (THC)	916.7	mV	800-1,350
Detector	78.1	kPa	((Pressure Air/1013)x100) - 20 ± 4 kPa
Purifier	19.4	kPa	8 - 25
NMC	259.8	°C	260 ± 10
Bypass	0.9	L / min	0.9 ± 0.3
Over Flow	0.8	L / Min	0.8

Calibrated by :

Approved by :



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Calibration Report Total Hydrocarbon Analyzer			
Date :	04 April 2023	Brand :	HORIBA
No.	B01	Model :	APHA-360CE
		Serial No.	4211954001
Calibrator (Dilution System)			
Brand :	API	Model :	700
Last Cal. Date :	04 August 2022	Serial No.	911
Reference Standard Gas			
Standard Gas :	Methane (CH ₄)	Cylinder No.	D612165
Certified Date :	25 February 2023	Expired Date :	25 February 2031
		Cylinder Conc.	453 ppm
Calibrating Condition			
Pressure	1011 mmbar	Temp.	24.5 °C
		% RH	48
		Start Time :	9:00 AM
Pre-Calibration Checks			
Change Particulate Filter	Yes	Station Temp :	25.0 °C
Leak Test	Yes		
Calibration Setting			
Span Set Point	Initial Reading (Before Adj)		Final Reading (After Adj)
	Expected Concentration (PPM)	Analyzer Response (PPM)	Analyzer Response (PPM)
Zero	0	0.10	0
Span	10	10.04	10
Calibration Setting (Final)			
Span Instrument Gain:	0.997	Finish Time:	10:00 AM
APHA-360 Total Hydrocarbon Analyzer			
Test Values	Observed Value	Units	Nominal Range
Signal (CH ₄)	911.7	mV	800-1,350
Signal (THC)	916.5	mV	800-1,350
Detector	78.2	kPa	((Pressure Air/1013)x100)-20 ± 4 kPa
Purifier	19.4	kPa	8 - 25
NMC	258.6	°C	260 ± 10
Bypass	0.9	L / min	0.9 ± 0.3
Over Flow	0.8	L / Min	0.8

Calibrated by :

Approved by :



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Calibration Report Total Hydrocarbon Analyzer			
Date :	04 April 2023	Brand :	HORIBA
No.	R01	Model :	APHA-370
		Serial No.	WDDDN38N
Calibrator (Dilution System)			
Brand :	API	Model :	700
Last Cal. Date :	04 August 2022	Serial No.	911
Reference Standard Gas			
Standard Gas :	Methane (CH ₄)	Cylinder No.	D612165
Certified Date :	25 February 2023	Expired Date :	25 February 2031
		Cylinder Conc.	453 ppm
Calibrating Condition			
Pressure	1011 mmbar	Temp.	24.5 °C
		% RH	48
		Start Time :	10:00 AM
Pre-Calibration Checks			
Change Particulate Filter	Yes	Station Temp :	25.0 °C
Leak Test	Yes		
Calibration Setting			
Span Set Point	Initial Reading (Before Adj)		Final Reading (After Adj)
	Expected Concentration (PPM)	Analyzer Response (PPM)	Analyzer Response (PPM)
Zero	0	0.11	0
Span	10	10.03	10
Calibration Setting (Final)			
Span Instrument Gain:	0.998	Finish Time:	11:00 AM
APHA-360 Total Hydrocarbon Analyzer			
Test Values	Observed Value	Units	Nominal Range
Signal (CH ₄)	912.2	mV	800-1,350
Signal (THC)	917.1	mV	800-1,350
Detector	77.9	kPa	((Pressure Air/1013)x100)-20 ± 4 kPa
Purifier	19.2	kPa	8 - 25
NMC	259.3	°C	260 ± 10
Bypass	0.9	L / min	0.9 ± 0.3
Over Flow	0.8	L / Min	0.8

Calibrated by :

Approved by :



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Calibration Report Total Hydrocarbon Analyzer			
Date :	04 May 2023	Brand :	HORIBA
		Model :	APHA-360CE
No.	R01	Serial No.	4211954001
Calibrator (Dilution System)			
Brand :	API	Model :	700
Last Cal. Date :	04 August 2022	Serial No. :	911
Reference Standard Gas			
Standard Gas :	Methane (CH ₄)	Cylinder No. :	D612165
Certified Date :	25 February 2023	Expired Date :	25 February 2031
		Cylinder Conc. :	453 ppm
Calibrating Condition			
Pressure	1011 mmbar	Temp.	24.6 °C
		% RH	50
		Start Time :	10:00 AM
Pre-Calibration Checks			
Change Particulate Filter	Yes	Station Temp :	25.0 °C
Leak Test	Yes		
Calibration Setting			
Span Set Point	Initial Reading (Before Adj)		Final Reading (After Adj)
	Expected Concentration (PPM)	Analyzer Response (PPM)	Analyzer Response (PPM)
Zero	0	0.11	0
Span	10	10.05	10
Calibration Setting (Final)			
Span Instrument Gain:	0.996	Finish Time:	11:00 AM
APHA-360 Total Hydrocarbon Analyzer			
Test Values	Observed Value	Units	Nominal Range
Signal (CH ₄)	912.3	mV	800-1,350
Signal (THC)	917.4	mV	800-1,350
Detector	78.0	kPa	((Pressure Air/1013)x100)-20 ± 4 kPa
Purifier	19.2	kPa	8 - 25
NMC	259.1	°C	260 ± 10
Bypass	0.9	L / min	0.9 ± 0.3
Over Flow	0.8	L / Min	0.8

Calibrated by : _____

Approved by : _____



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Tel : (662) 939-4370-72 Fax : (662) 513-4221 E-mail : sale@spscon.com, www.spscon.com

Calibration Report Total Hydrocarbon Analyzer			
Date :	04 May 2023	Brand :	HORIBA
		Model :	APHA-370
No.	R01	Serial No.	WDDDN38N
Calibrator (Dilution System)			
Brand :	API	Model :	700
Last Cal. Date :	04 August 2022	Serial No. :	911
Reference Standard Gas			
Standard Gas :	Methane (CH ₄)	Cylinder No. :	D612165
Certified Date :	25 February 2023	Expired Date :	25 February 2031
		Cylinder Conc. :	453 ppm
Calibrating Condition			
Pressure	1011 mmbar	Temp.	24.6 °C
		% RH	50
		Start Time :	9:00 AM
Pre-Calibration Checks			
Change Particulate Filter	Yes	Station Temp :	25.0 °C
Leak Test	Yes		
Calibration Setting			
Span Set Point	Initial Reading (Before Adj)		Final Reading (After Adj)
	Expected Concentration (PPM)	Analyzer Response (PPM)	Analyzer Response (PPM)
Zero	0	-0.10	0
Span	10	10.04	10
Calibration Setting (Final)			
Span Instrument Gain:	0.997	Finish Time:	10:00 AM
APHA-360 Total Hydrocarbon Analyzer			
Test Values	Observed Value	Units	Nominal Range
Signal (CH ₄)	911.5	mV	800-1,350
Signal (THC)	916.8	mV	800-1,350
Detector	78.1	kPa	((Pressure Air/1013)x100)-20 ± 4 kPa
Purifier	19.0	kPa	8 - 25
NMC	258.7	°C	260 ± 10
Bypass	0.9	L / min	0.9 ± 0.3
Over Flow	0.8	L / Min	0.8

Calibrated by : _____

Approved by : _____



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CALIBRATION REPORT					
CHEMILUMINESCENT NO / NO ₂ / NO _x ANALYZER					
DATE :	29 January 2023	BRAND :	API	MODEL :	200E
NO.	NOX-B08	SERIAL NO.	2286		
Calibrator (Dilution System)					
Brand	: API		Model	: 700	
Last Cal. Date	: 04 August 2022		Serial No.	: 911	
Reference Standard Gas					
Standard Gas	: Nitric Oxide (NO)		Cylinder No.	: D636192	
Certified Date	: 20 April 2022		Expired Date	: 20 April 2024	
			Cylinder Conc.	: 49.1 ppm	
CALIBRATING CONDITION					
Pressure	1011	mmbar	Temp.	24.5	°C
			% RH	49	
CALIBRATION SETTING					
Span	Initial Reading (Before Adj.),PPB			Final Reading (After Adj.),PPB	
Set Point	Expected Concentration	Analyzer Response	%Diff	Analyzer Response	Slope
Zero	0	0.10	-	0	-
NO Span	400	400.1	0.025	400.0	1.008
NO _x Span	400	400.3	0.075	400.0	1.011
API Model 200E NO _x Analyzer Check List					
Test Values	Observed Value	Units	Nominal Range		
RANGE	500	PPB	500 standard		
STABILITY (Zero Gas)	0.1	PPB	< 2 with zero air		
SAMPLE FLOW	508	cc/min	500 ± 50		
OZONE FLOW	78	cc/min	80 ± 15		
PMT	103.3	mV	-20 - 150		
AZERO	94.1	mV	-20 - 150		
HVPS	674	V	420 - 900 constant		
RCCELL TEMP	50.3	°C	50 ± 1		
BOX TEMP	29.1	°C	8 - 48		
PMT TEMP	7.0	°C	7 ± 2		
MOLY TEMP	315.2	°C	315 ± 5		
RCCELL 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	1.008	-	1.0 ± 0.3		
NO _x Slope	1.011	-	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 :

Approved by :



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Tel : (662) 939-4370-72, Fax : (662) 513-4221, E-mail : sales@spscon.com, www.spscon.com

CALIBRATION REPORT					
CHEMILUMINESCENT NO / NO ₂ / NO _x ANALYZER					
DATE :	29 January 2023	BRAND :	API	MODEL :	200A
NO.	NOX-B15	SERIAL NO.	213		
Calibrator (Dilution System)					
Brand	: API		Model	: 700	
Last Cal. Date	: 04 August 2022		Serial No.	: 911	
Reference Standard Gas					
Standard Gas	: Nitric Oxide (NO)		Cylinder No.	: D636192	
Certified Date	: 20 April 2022		Expired Date	: 20 April 2024	
			Cylinder Conc.	: 49.1 ppm	
CALIBRATING CONDITION					
Pressure	1011	mmbar	Temp.	24.5	°C
			% RH	49	
CALIBRATION SETTING					
Span	Initial Reading (Before Adj.),PPB			Final Reading (After Adj.),PPB	
Set Point	Expected Concentration	Analyzer Response	%Diff	Analyzer Response	Slope
Zero	0	0.11	-	0	-
NO Span	400	399.6	0.100	400.0	1.003
NO _x Span	400	399.9	-0.025	400.0	1.007
API Model 200A NO _x Analyzer Check List					
Test Values	Observed Value	Units	Nominal Range		
RANGE	500	PPB	500 standard		
STABILITY (Zero Gas)	0.1	PPB	< 2 with zero air		
SAMPLE FLOW	508	cc/min	500 ± 50		
OZONE FLOW	79	cc/min	80 ± 15		
PMT	103.2	mV	-20 - 150		
AZERO	93.9	mV	-20 - 150		
HVPS	673	V	420 - 900 constant		
RCCELL TEMP	50.2	°C	50 ± 1		
BOX TEMP	29.4	°C	8 - 48		
PMT TEMP	7.1	°C	7 ± 2		
MOLY TEMP	314.9	°C	315 ± 5		
RCCELL PRESS	8.3	IN Hg -A	2 - 10 constant		
SAMPLE PRESS	28.6	IN-Hg-A	25 - 30 constant		
NO Span Conc	400	PPB	20 - 20,000		
NO _x Span Conc	400	PPB	20 - 20,000		
NO Slope	1.003	-	1.0 ± 0.3		
NO _x Slope	1.007	-	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 :

Approved by :



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CALIBRATION REPORT					
CHEMILUMINESCENT NO / NO ₂ / NO _x ANALYZER					
DATE :	23 February 2023	BRAND :	API	MODEL :	200E
NO.	NOX-B05	SERIAL NO.	2284		
Calibrator (Dilution System)					
Brand	: API		Model	: 700	
Last Cal. Date	: 04 August 2022		Serial No.	: 911	
Reference Standard Gas					
Standard Gas	: Nitric Oxide (NO)		Cylinder No.	: D636192	
Certified Date	: 20 April 2022		Expired Date	: 20 April 2024	
Cylinder Conc.	: 49.1 ppm				
CALIBRATING CONDITION					
Pressure	1011	mmbar	Temp.	24.5	°C
% RH	49				
CALIBRATION SETTING					
Span	Initial Reading (Before Adj.),PPB			Final Reading (After Adj.),PPB	
Set Point	Expected Concentration	Analyzer Response	%Diff	Analyzer Response	Slope
Zero	0	-0.11	-	0	-
NO Span	400	399.9	-0.025	400.0	1.008
NO _x Span	400	400.2	0.050	400.0	1.009
API Model 200E NO _x Analyzer Check List					
Test Values	Observed Value	Units	Nominal Range		
RANGE	500	PPB	500 standard		
STABILITY (Zero Gas)	0.1	PPB	< 2 with zero air		
SAMPLE FLOW	505	cc/min	500 ± 50		
OZONE FLOW	78	cc/min	80 ± 15		
PMT	103.4	mV	20 - 150		
AZERO	94.2	mV	-20 - 150		
HVPS	870	V	420 - 900 constant		
RCCELL TEMP	50.1	°C	50 ± 1		
BOX TEMP	29.2	°C	8 - 48		
PMT TEMP	7.4	°C	7 ± 2		
MOLY TEMP	314.9	°C	315 ± 5		
RCCELL PRESS	8.3	IN Hg-A	2 - 10 constant		
SAMPLE PRESS	28.5	IN Hg-A	25 - 30 constant		
NO Span Conc	400	PPB	20 - 20,000		
NO _x Span Conc	400	PPB	20 - 20,000		
NO Slope	1.008	-	1.0 ± 0.3		
NO _x Slope	1.009	-	1.0 ± 0.3		
NO Offset	1.2	mV	-20 to +150		
NO _x Offset	0.9	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 :

Approved by :



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CALIBRATION REPORT					
CHEMILUMINESCENT NO / NO ₂ / NO _x ANALYZER					
DATE :	23 February 2023	BRAND :	API	MODEL :	200L
NO.	NOX-B19	SERIAL NO.	353		
Calibrator (Dilution System)					
Brand	: API		Model	: 700	
Last Cal. Date	: 04 August 2022		Serial No.	: 911	
Reference Standard Gas					
Standard Gas	: Nitric Oxide (NO)		Cylinder No.	: D636192	
Certified Date	: 20 April 2022		Expired Date	: 20 April 2024	
Cylinder Conc.	: 49.1 ppm				
CALIBRATING CONDITION					
Pressure	1011	mmbar	Temp.	24.5	°C
% RH	49				
CALIBRATION SETTING					
Span	Initial Reading (Before Adj.),PPB			Final Reading (After Adj.),PPB	
Set Point	Expected Concentration	Analyzer Response	%Diff	Analyzer Response	Slope
Zero	0	-0.10	-	0	-
NO Span	400	400.1	0.025	400.0	1.008
NO _x Span	400	400.3	0.075	400.0	1.011
API Model 200E NO _x Analyzer Check List					
Test Values	Observed Value	Units	Nominal Range		
RANGE	500	PPB	500 standard		
STABILITY (Zero Gas)	0.1	PPB	< 2 with zero air		
SAMPLE FLOW	512	cc/min	500 ± 50		
OZONE FLOW	79	cc/min	80 ± 15		
PMT	103.1	mV	20 - 150		
AZERO	93.9	mV	-20 - 150		
HVPS	872	V	420 - 900 constant		
RCCELL TEMP	50.0	°C	50 ± 1		
BOX TEMP	29.3	°C	8 - 48		
PMT TEMP	7.2	°C	7 ± 2		
MOLY TEMP	315.1	°C	315 ± 5		
RCCELL PRESS	8.2	IN-Hg-A	2 - 10 constant		
SAMPLE PRESS	28.4	IN-Hg-A	25 - 30 constant		
NO Span Conc	400	PPB	20 - 20,000		
NO _x Span Conc	400	PPB	20 - 20,000		
NO Slope	1.008	-	1.0 ± 0.3		
NO _x Slope	1.011	-	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 :

Approved by :



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CALIBRATION REPORT					
CHEMILUMINESCENT NO / NO ₂ / NO _x ANALYZER					
DATE :	18 March 2023	BRAND :	API	MODEL :	200A
NO.	NOX-B03	SERIAL NO.	2617		
Calibrator (Dilution System)					
Brand	API		Model	700	
Last Cal. Date	04 August 2022		Serial No.	911	
Reference Standard Gas					
Standard Gas	Nitric Oxide (NO)		Cylinder No.	D636192	
Certified Date	20 April 2022		Expired Date	20 April 2024	
Cylinder Conc.	49.1 ppm				
CALIBRATING CONDITION					
Pressure	1011	mmbar	Temp.	24.5	°C
% RH	49				
CALIBRATION SETTING					
Span	Initial Reading (Before Adj.),PPB			Final Reading (After Adj.),PPB	
Set Point	Expected Concentration	Analyzer Response	%Diff	Analyzer Response	Slope
Zero	0	-0.10	-	0	-
NO Span	400	399.6	-0.100	400.0	1.002
NO _x Span	400	399.8	-0.050	400.0	1.003
API Model 200A NO _x Analyzer Check List					
Test Values	Observed Value	Units	Nominal Range		
RANGE	500	PPB	500 standard		
STABILITY (Zero Gas)	0.1	PPB	< 2 with zero air		
SAMPLE FLOW	503	cc/min	500 ± 50		
OZONE FLOW	78	cc/min	80 ± 15		
PMT	103.3	mV	20 - 150		
AZIRO	94.1	mV	20 - 150		
HVPS	874	V	420 - 900 constant		
RCELL TEMP	50.2	°C	50 ± 1		
BOX TEMP	29.0	°C	8 - 48		
PMT TEMP	7.3	°C	7 ± 2		
MOLY TEMP	314.9	°C	315 ± 5		
RCELL PRESS	8.4	IN-Hg-A	2 - 10 constant		
SAMPLE PRESS	28.7	IN-Hg-A	25 - 30 constant		
NO Span Conc	400	PPB	20 - 20,000		
NO _x Span Conc	400	PPB	20 - 20,000		
NO Slope	1.002	-	1.0 ± 0.3		
NO _x Slope	1.003	-	1.0 ± 0.3		
NO Offset	1.0	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 :

Approved by :



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CALIBRATION REPORT					
CHEMILUMINESCENT NO / NO ₂ / NO _x ANALYZER					
DATE :	18 March 2023	BRAND :	API	MODEL :	200A
NO.	NOX-B15	SERIAL NO.	213		
Calibrator (Dilution System)					
Brand	API		Model	700	
Last Cal. Date	04 August 2022		Serial No.	911	
Reference Standard Gas					
Standard Gas	Nitric Oxide (NO)		Cylinder No.	D636192	
Certified Date	20 April 2022		Expired Date	20 April 2024	
Cylinder Conc.	49.1 ppm				
CALIBRATING CONDITION					
Pressure	1011	mmbar	Temp.	24.5	°C
% RH	49				
CALIBRATION SETTING					
Span	Initial Reading (Before Adj.),PPB			Final Reading (After Adj.),PPB	
Set Point	Expected Concentration	Analyzer Response	%Diff	Analyzer Response	Slope
Zero	0	0.10	-	0	-
NO Span	400	400.1	0.023	400.0	1.0019
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	508	cc/min	500 ± 50		
OZONE FLOW	78	cc/min	80 ± 15		
PMT	102.9	mV	20 - 150		
AZIRO	93.7	mV	20 - 150		
HVPS	871	V	420 - 900 constant		
RCELL TEMP	50.4	°C	50 ± 1		
BOX TEMP	29.2	°C	8 - 48		
PMT TEMP	7.1	°C	7 ± 2		
MOLY TEMP	315.2	°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	1.009	-	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 :

Approved by :



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CALIBRATION REPORT					
CHEMILUMINESCENT NO / NO ₂ / NO _x ANALYZER					
DATE :	24 April 2023	BRAND :	API	MODEL :	200E
NO.	NOX-B09	SERIAL NO.	4412		
Calibrator (Dilution System)					
Brand :	API		Model :	700	
Last Cal. Date :	04 August 2022		Serial No. :	911	
Reference Standard Gas					
Standard Gas :	Nitric Oxide (NO)		Cylinder No. :	D636192	
Certified Date :	20 April 2022	Expired Date :	20 April 2024	Cylinder Conc. :	49.1 ppm
CALIBRATING CONDITION					
Pressure	1011 mmbar	Temp.	24.5 °C	% RH	49
CALIBRATION SETTING					
Span	Initial Reading (Before Adj.),PPB			Final Reading (After Adj.),PPB	
Set Point	Expected Concentration	Analyzer Response	%Diff	Analyzer Response	Slope
Zero	0	0.11	-	0	-
NO Span	400	400.1	0.025	400.0	1.009
NO _x Span	400	400.4	0.100	400.0	1.013
API Model 200E NO _x Analyzer Check List					
Test Values	Observed Value	Units	Nominal Range		
RANGE	500	PPB	500 standard		
STABILITY (Zero Gas)	0.1	PPB	< 2 with zero air		
SAMPLE FLOW	503	cc/min	500 ± 50		
OZONE FLOW	78	cc/min	80 ± 15		
PMT	103.2	mV	-20 - 150		
AZ/ERO	94.0	mV	-20 - 150		
HVPS	673	V	420 - 900 constant		
RC/LL TEMP	50.2	°C	50 ± 1		
BOX TEMP	29.5	°C	6 - 48		
PMT TEMP	7.1	°C	7 ± 2		
MOLY TEMP	315.2	°C	315 ± 5		
RC/LL PRESS	8.2	IN-Hg-A	2 - 10 constant		
SAMPLE PRESS	28.4	IN-Hg-A	25 - 30 constant		
NO Span Conc	400	PPB	20 - 20,000		
NO _x Span Conc	400	PPB	20 - 20,000		
NO Slope	1.009		1.0 ± 0.3		
NO _x Slope	1.013		1.0 ± 0.3		
NO Offset	1.6	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 :

Approved by :



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CALIBRATION REPORT					
CHEMILUMINESCENT NO / NO ₂ / NO _x ANALYZER					
DATE :	24 April 2023	BRAND :	API	MODEL :	200E
NO.	NOX-R16	SERIAL NO.	249		
Calibrator (Dilution System)					
Brand :	API		Model :	700	
Last Cal. Date :	04 August 2022		Serial No. :	911	
Reference Standard Gas					
Standard Gas :	Nitric Oxide (NO)		Cylinder No. :	D636192	
Certified Date :	20 April 2022	Expired Date :	20 April 2024	Cylinder Conc. :	49.1 ppm
CALIBRATING CONDITION					
Pressure	1011 mmbar	Temp.	24.5 °C	% RH	49
CALIBRATION SETTING					
Span	Initial Reading (Before Adj.),PPB			Final Reading (After Adj.),PPB	
Set Point	Expected Concentration	Analyzer Response	%Diff	Analyzer Response	Slope
Zero	0	0.10	-	0	-
NO Span	400	399.6	-0.050	400.0	1.006
NO _x Span	400	400.1	0.025	400.0	1.009
API Model 200E NO _x Analyzer Check List					
Test Values	Observed Value	Units	Nominal Range		
RANGE	500	PPB	500 standard		
STABILITY (Zero Gas)	0.1	PPB	< 2 with zero air		
SAMPLE FLOW	511	cc/min	500 ± 50		
OZONE FLOW	79	cc/min	80 ± 15		
PMT	103.1	mV	-20 - 150		
AZ/ERO	93.8	mV	-20 - 150		
HVPS	671	V	420 - 900 constant		
RC/LL TEMP	50.3	°C	50 ± 1		
BOX TEMP	29.2	°C	6 - 48		
PMT TEMP	7.4	°C	7 ± 2		
MOLY TEMP	314.8	°C	315 ± 5		
RC/LL 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	1.006		1.0 ± 0.3		
NO _x Slope	1.009		1.0 ± 0.3		
NO Offset	1.3	mV	-20 to +150		
NO _x Offset	0.6	mV	-20 to 150		
Stability at Zero	0.1	PPB	< 0.2		
Stability at Span	0.2	PPB	< 2 ppb @ 400 ppb span gas		

Calibrated by :

Approved by :



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CALIBRATION REPORT					
CHEMILUMINESCENT NO / NO ₂ / NO _x ANALYZER					
DATE :	25 May 2023	BRAND :	API	MODEL :	200A
NO.	NOX B01	SERIAL NO.	2366		
Calibrator (Dilution System)					
Brand :	API	Model :	700		
Last Cal. Date :	04 August 2022	Serial No. :	911		
Reference Standard Gas					
Standard Gas :	Nitric Oxide (NO)	Cylinder No. :	D836192		
Certified Date :	20 April 2022	Expired Date :	20 April 2024	Cylinder Conc. :	49.1 ppm
CALIBRATING CONDITION					
Pressure	1011 mmbar	Temp.	24.6 °C	% RH	49
CALIBRATION SETTING					
Span	Initial Reading (Before Adj.),PPB			Final Reading (After Adj.),PPB	
Set Point	Expected Concentration	Analyzer Response	%Dif	Analyzer Response	Slope
Zero	0	0.11	-	0	-
NO Span	400	399.9	-0.025	400.0	1.006
NO _x Span	400	400.2	0.050	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	504	cc/min	500 ± 50		
OZONE FLOW	78	cc/min	80 ± 15		
PMT	103.1	mV	-20 - 150		
AZERO	93.9	mV	-20 - 150		
HVPS	870	V	420 - 900 constant		
RCCELL TEMP	50.3	°C	50 ± 1		
BOX TEMP	29.4	°C	8 - 48		
PMT TEMP	7.2	°C	7 ± 2		
MOLY TEMP	314.9	°C	315 ± 5		
RCCELL PRESS	8.4	IN-Hg-A	2 - 10 constant		
SAMPLE PRESS	28.7	IN-Hg-A	25 - 30 constant		
NO Span Conc	400	PPB	20 - 20,000		
NO _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	1.3	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 :

Approved by :



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CALIBRATION REPORT					
CHEMILUMINESCENT NO / NO ₂ / NO _x ANALYZER					
DATE :	25 May 2023	BRAND :	API	MODEL :	200E
NO.	NOX-B06	SERIAL NO.	2286		
Calibrator (Dilution System)					
Brand :	API	Model :	700		
Last Cal. Date :	04 August 2022	Serial No. :	911		
Reference Standard Gas					
Standard Gas :	Nitric Oxide (NO)	Cylinder No. :	D836192		
Certified Date :	20 April 2022	Expired Date :	20 April 2024	Cylinder Conc. :	49.1 ppm
CALIBRATING CONDITION					
Pressure	1011 mmbar	Temp.	24.6 °C	% RH	49
CALIBRATION SETTING					
Span	Initial Reading (Before Adj.),PPB			Final Reading (After Adj.),PPB	
Set Point	Expected Concentration	Analyzer Response	%Dif	Analyzer Response	Slope
Zero	0	-0.10	-	0	-
NO Span	400	399.5	-0.125	400.0	1.003
NO _x Span	400	399.6	-0.050	400.0	1.006
API Model 200E NO _x Analyzer Check List					
Test Values	Observed Value	Units	Nominal Range		
RANGE	500	PPB	500 standard		
STABILITY (Zero Gas)	0.1	PPB	< 2 with zero air		
SAMPLE FLOW	508	cc/min	500 ± 50		
OZONE FLOW	78	cc/min	80 ± 15		
PMT	103.3	mV	-20 - 150		
AZERO	94.1	mV	-20 - 150		
HVPS	874	V	420 - 900 constant		
RCCELL TEMP	50.0	°C	50 ± 1		
BOX TEMP	28.8	°C	8 - 48		
PMT TEMP	7.1	°C	7 ± 2		
MOLY TEMP	315.2	°C	315 ± 5		
RCCELL 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	1.003	-	1.0 ± 0.3		
NO _x Slope	1.006	-	1.0 ± 0.3		
NO Offset	1.0	mV	-20 to 150		
NO _x Offset	0.5	mV	-20 to 150		
Stability at Zero	0.1	PPB	< 0.2		
Stability at Span	0.2	PPB	< 2 ppb @ 400 ppb span gas		

Calibrated by :

Approved by :

เอกสารที่ 5-2

เอกสารสอบเทียบเครื่องมือการตรวจวัดระดับเสียง



THAILAND INSTITUTE OF SCIENTIFIC AND TECHNOLOGICAL RESEARCH (TISTR)

Request No. 21-65/0455

MTC No. EEL. BP. 41/0465

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 of instrument was 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 : 22 Apr. 2022

Date of Calibration : 28 Apr. 2022

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

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

FM.BLMTC.002 Rev.4



THAILAND INSTITUTE OF SCIENTIFIC AND TECHNOLOGICAL RESEARCH (TISTR)

Request No. 21-65/0455

MTC No. EEL. BP. 41/0465

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	93.93	-0.07	± 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	1.44	± 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 :

Approved by :

Date of Calibration : 28 Apr. 2022

Date of Issue : 28 Apr. 2022

Electrical and Electronic Standards Laboratory
Industrial Metrology and Testing Service Centre

Ref : 2011265042601787001

2 / 2

End of Certificate

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

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FM.BLMTC.002 Rev.4

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Amphoe Muang, Changwat Samutprakan 10280, Thailand
Tel. (66) 0 2323 1672-80 ext. 115, 116
Fax. (66) 0 2323 9165
E-mail : mtc@tistr.or.th

Office
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Fax. (66) 0 2579 8592
E-mail : sumalee@tistr.or.th

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THAILAND INSTITUTE OF SCIENTIFIC AND TECHNOLOGICAL RESEARCH (TISTR)

Request No. 21-66/0413

MTC No. EEL. BP. 109/0366

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

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.

Ambient Environment

Temperature : $(23 \pm 3) ^\circ\text{C}$

Relative Humidity : $(50 \pm 15) \%$

Ambient Pressure : $(101.325 \pm 1.500) \text{ kPa}$

Calibration Procedure: CP-102-04 based on IEC 60942-2003. The sound pressure level of instrument was 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 : 27 Mar. 2023

Date of Calibration : 29 Mar. 2023

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

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

FM.BLMTC.002 Rev.4



THAILAND INSTITUTE OF SCIENTIFIC AND TECHNOLOGICAL RESEARCH (TISTR)

Request No. 21-66/0413

MTC No. EEL. BP. 109/0366

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 20 μPa at 1000 Hz

Acoustic Output in dB re 20 μPa , Corrected to Reference Conditions : 101.325 kPa, 23.0 $^\circ\text{C}$ 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	93.94	-0.06	± 0.10	$\pm 0.40 \text{ dB}$

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	$\pm 1.0\%$

3. Total distortion

Standard Microphone Type	Measured Total distortion (%)	Uncertainty (%)	Tolerance limit IEC60942:2003 Class 1
1/2 inch Bruel&Kjaer 4180	1.80	± 0.50	$\pm 3.0\%$

Note : 1. No adjustment.

2. The calibrator pressure correction was not included.

3. The microphone volume correction was not included.

Calibrated by :

Approved by :



Date of Calibration : 29 Mar. 2023

Date of Issue : 30 Mar. 2023

Electrical and Electronic Standards Laboratory

Industrial Metrology and Testing Service Centre

Ref : 2011266032701228001

End of Certificate

2 / 2

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

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FM.BLMTC.002 Rev.4

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Fax. (66) 0 2579 8592
E-mail : sumalee@tistr.or.th



บริษัท เอส.พี.เอส. คอนซัลติ้ง เซอร์วิส จำกัด
S.P.S. CONSULTING SERVICE CO., LTD.
7 ซอยพหลโยธิน 24 แขวงพญาไท กรุงเทพมหานคร 10600
7 Soi Phaholyothin 24, Phayathai Rd., Jomjol, Chulabulak, Bangkok 10600
Tel : (662) 939-4179-72 Fax : (662) 513-0211 Email : ssk@spscs.com, www.spscs.com

Noise B_026/23

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	28 April 2022
		Due Date	28 April 2023

Calibration Data

Sound Level Meter Data

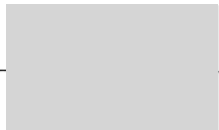
Calibration Data

SLM No.	Brand	Model	Serial No.	Date	Actual Reading [dB]	
					Before Adjustment	After Adjustment
ACO-B17	ACO	6236	00172042	20 January 2023	94.0	94.0
ACO-B25	ACO	6236	00182006	20 January 2023	93.9	94.0

Acoustic Certified Value : Thailand Institute of Scientific and Technological Research (TISTR)

93.93 ± 0.10 dB

Calibrated by :



Approved by :



บริษัท เอส.พี.เอส. คอนซัลติ้ง เซอร์วิส จำกัด
S.P.S. CONSULTING SERVICE CO., LTD.
7 ซอยพหลโยธิน 24 แขวงพญาไท กรุงเทพมหานคร 10600
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Tel : (662) 939-4179-72 Fax : (662) 513-0211 Email : ssk@spscs.com, www.spscs.com

Noise B_064/23

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	28 April 2022
		Due Date	28 April 2023

Calibration Data

Sound Level Meter Data

Calibration Data

SLM No.	Brand	Model	Serial No.	Date	Actual Reading [dB]	
					Before Adjustment	After Adjustment
ACO-B22	ACO	6236	00172060	26 February 2023	94.1	94.0
ACO-B84	ACO	6236	00192025	26 February 2023	94.0	94.0

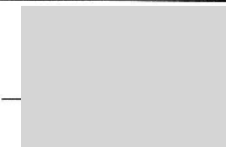
Acoustic Certified Value : Thailand Institute of Scientific and Technological Research (TISTR)

93.93 ± 0.10 dB

Calibrated by :



Approved by :





บริษัท เอส.พี.เอส. คอนซัลติ้ง เซอร์วิส จำกัด
S.P.S. CONSULTING SERVICE CO., LTD.
7 ซอยพหลโยธิน 24, Phaholyothin Rd., Joohep, Chatuchak, Bangkok 10900
Tel : (0)2-946-070-72, Fax : (062) 911-4021, E-mail : ssk@spscon.com, www.spscon.com

Noise B_100/23

Sound Level Meter Calibration Report

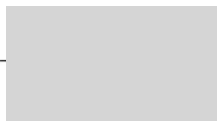
Acoustic Calibrator Data

Brand	ACO	Number	AC 03/56
Model	2127	Serial No.	130006
Calibration Range	94 dB, 1000 Hz	Last Calibration	28 April 2022
		Due Date	28 April 2023

Calibration Data

Sound Level Meter Data				Calibration Data		
SLM No.	Brand	Model	Serial No.	Date	Actual Reading [dB]	
					Before Adjustment	After Adjustment
ACO-B21	ACO	6236	00172059	19 March 2023	94.0	94.0
ACO-B25	ACO	6236	00102026	19 March 2023	94.0	94.0
Acoustic Certified Value : Thailand Institute of Scientific and Technological Research (TISTR)					93.93 ± 0.10 dB	

Calibrated by :



Approved by :



บริษัท เอส.พี.เอส. คอนซัลติ้ง เซอร์วิส จำกัด
S.P.S. CONSULTING SERVICE CO., LTD.
7 ซอยพหลโยธิน 24, Phaholyothin Rd., Joohep, Chatuchak, Bangkok 10900
Tel : (0)2-946-070-72, Fax : (062) 911-4021, E-mail : ssk@spscon.com, www.spscon.com

Noise B_154/23

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	29 March 2023
		Due Date	29 March 2024

Calibration Data

Sound Level Meter Data				Calibration Data		
SLM No.	Brand	Model	Serial No.	Date	Actual Reading [dB]	
					Before Adjustment	After Adjustment
ACO-B03	ACO	6236	00222297	24 April 2023	94.0	94.0
ACO-B04	ACO	6236	00222288	24 April 2023	94.0	94.0
Acoustic Certified Value : Thailand Institute of Scientific and Technological Research (TISTR)					93.94 ± 0.10 dB	

Calibrated by :



Approved by :





บริษัท เอส.พี.เอส. คอนซัลติ้ง เซอร์วิส จำกัด
S.P.S. CONSULTING SERVICE CO., LTD.
7 ซอยพหลโยธิน 24 แขวงจตุจักร เขตจตุจักร กรุงเทพฯ 10000
7 Soi Phayathai 24 Phayathai Rd., Jomae, Chulachok, Bangkok 10000
Tel : (06) 9194-1077 Fax : (02) 513-1221 E-mail : info@sps.co.th www.sps.co.th

Noise B_214/23

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	29 March 2023
		Due Date	29 March 2024

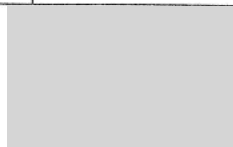
Calibration Data

Sound Level Meter Data				Calibration Data	
SLM No.	Brand	Model	Serial No.	Date	Actual Reading [dB]
					Before Adjustment After Adjustment
ACO-B32	ACO	6236	00182014	25 May 2023	94.0 94.0
ACO B37	ACO	6236	00192028	25 May 2023	94.1 94.0
Acoustic Certified Value : Thailand Institute of Scientific and Technological Research (TISTR)					93.94 ± 0.10 dB

Calibrated by :



Approved by :



เอกสารที่ 5-3

เอกสารสอบเทียบเครื่องมือการตรวจวิเคราะห์คุณภาพน้ำทิ้ง



CERTIFICATE No : 22E9693
REFERENCE No : 66476-1

PAGE : 1 OF 3

Certificate of Calibration

EQUIPMENT : pH METER
MANUFACTURER : HANNA
MODEL : HI 3512
SERIAL No : TH118035
ID No : pH 04/56
CONDITION AS RECEIVED : USED ITEM
SUBMITTED BY : S.P.S. CONSULTING SERVICE CO., LTD.
7 SOI PHAHOLYOTHIN 24, PHAHOLYOTHIN RD.,
JOMPOL, CHATUCHAK, BANGKOK 10900

CALIBRATED BY : ATSAWIN Y.

CALIBRATION DATE : 15-Sep-22

APPROVED BY :

ISSUED DATE : 15-Sep-22

RECEIVED DATE : 14-Sep-22



CERTIFICATE No : 22E9693

PAGE : 2 OF 3

Calibration Report

EQUIPMENT : pH METER
MANUFACTURER : HANNA
ID No : pH 04/56
RECEIVED DATE : 14-Sep-22
AMBIENT TEMPERATURE : 20 °C ± 1 °C
MODEL : HI 3512
SERIAL NUMBER : TH118035
CALIBRATION DATE : 15-Sep-22
RELATIVE HUMIDITY : 50 % RH ± 10% RH

CONDITION OF THIS RESULTS OF CALIBRATION

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

INSTRUMENT	MODEL	SERIAL No/ LOT No	CERTIFICATE No	DUE DATE
1) pH STANDARD SOLUTION	00651-06	CC719181	4880-12119147	05-Apr-23
2) pH STANDARD SOLUTION	00651-08	CC718727	4881-12110709	31-Mar-23
3) pH STANDARD SOLUTION	00651-10	CC717045	4882-12065386	17-Mar-23
4) PROCESS CALIBRATOR	CA150	91S6079	22E1145	31-Mar-23
5) BATH	260014	1247 48074	22T9870	13-Sep-23
6) THERMOMETER WITH PROBE	421504	55000379	22T9904	13-Sep-23

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

RESULT OF CALIBRATION : ADJUSTMENT

1. DISPLAY UNIT ONLY

SLOPE FACTOR $k = 2.303 \text{ RT/F} = 59 \text{ mV/pH}$

mV APPLIED	UUC READING (mV)	CORRECTION (mV)	UUC READING (pH)	UNCERTAINTY OF MEASUREMENT (± mV)	COVERAGE FACTOR k
414.11	414.8	-0.69	-0.171	0.14	2.0
354.95	355.6	-0.65	0.860	0.14	2.0
295.80	296.4	-0.60	1.892	0.14	2.0
236.64	237.2	-0.56	2.922	0.14	2.0
177.48	178.0	-0.52	3.954	0.14	2.0
118.32	118.8	-0.48	4.985	0.14	2.0
59.16	59.7	-0.54	6.016	0.14	2.0
0.00	0.5	-0.50	7.049	0.14	2.0
-59.16	-58.8	-0.36	8.136	0.14	2.0
-118.32	-117.9	-0.42	9.223	0.14	2.0
-177.48	-177.1	-0.38	10.311	0.14	2.0
-236.64	-236.3	-0.34	11.399	0.14	2.0
-295.80	-295.5	-0.30	12.487	0.14	2.0
-354.95	-354.7	-0.25	13.575	0.14	2.0
-414.11	-413.9	-0.21	14.662	0.14	2.0

**QUALITY CALIBRATION CO.,LTD.**

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

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

CERTIFICATE No : 22E9693

PAGE : 3 OF 3

Calibration Report**RESULT OF CALIBRATION (CONTINUE) :****2. DISPLAY UNIT WITH pH ELECTRODE S/N: 09081C6M**

STANDARD pH BUFFER SOLUTION (pH)	UUC READING (pH)	CORRECTION (pH)	VALUE BEFORE ADJUSTMENT	UNCERTAINTY OF MEASUREMENT (\pm pH)	COVERAGE FACTOR k
4.007	4.007	0.000	3.996	0.012	2.0
7.004	7.006	-0.002	6.944	0.012	2.0
10.016	10.012	0.004	10.194	0.014	2.0

3. DISPLAY UNIT WITH TEMPERATURE

STANDARD READING ($^{\circ}$ C)	UUC READING ($^{\circ}$ C)	CORRECTION ($^{\circ}$ C)	VALUE BEFORE ADJUSTMENT	UNCERTAINTY OF MEASUREMENT (\pm $^{\circ}$ C)	COVERAGE FACTOR k
25.003	25.0	0.003	---	0.0085	2.0

4. PERCENT SLOPE 100%

UUC : UNIT UNDER CALIBRATION

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

END OF CALIBRATION REPORT



TECHNOLOGY PROMOTION ASSOCIATION (THAILAND-JAPAN)
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

Cert.No.: 22TW98
Page.: 1 of 2

Certificate of Testing

Equipment : DO Meter
Manufacturer : YSI
Model : 5000-230V
Serial No. : 15B100751
ID No. : -
Received Date : 20 April 2022
Test Date : 21 April 2022
Reference : 2204-0429WC-1
Submitted by : S.P.S. Consulting Service Co.,Ltd.
7 Phaholyothin 24, Phaholyothin Road.,
Jompol, Chatuchak, Bangkok 10900
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 :

Approved by :

Approved Signatory

Issue Date : 25 April 2022

B 0286555



Cert.No.: 22TW98
Page.: 2 of 2

Condition of this result of calibration

1. Reference Standard Instruments :

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

Instruments	Serial No.	ID No.	Certificate No.	Due Date
1) Burette	-	130BU10	21CG1389	25 Mar 2023
2) Balance	1126143764	140RC004	21MM430	21 Sep 2022

2. Standard Material :-

Material	Manufacturer	Lot.No.	Assay
Sodium Thiosulfate pentahydrate	Merck	AM1763316	100.2%

Result : Dissolved Oxygen Meter Adjustment With Air 100 %

Dissolved Oxygen Probe No.: 14J100195

Titration Method (Azide Modification Method) (mg/L)	DO Meter Reading (mg/L)	Standard Deviation (mg/L)
8.12	8.14	0.0084

This report was certified only for the instrument we tested. It is allowable to use for study the system efficiency. The environmental impact control and present to organization it may concerned. 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.

-o0o-

a 1105753

CERT.No.: HS-U017D

Calibration Date : 3 Apr 23
Submitted by : S.P.S CONSULTING SERVICE CO.,LTD
7 Soi Phaholyothin 24, Phaholyothin Rd., Jompol,
Chatuchak, Bangkok, Thailand 10900
Avg Room Temp : 20 °C
Avg Water Temp : 20 °C
Air Pressure : 760.00 mmHg
Salinity : 0 ppt

Model : YSI 5000
S/N : 15B100751
Probe : YSI 5010
S/N : 22D100097
ID NO. : -
Air Temp ref : S/N. E00522
Barometric ref : S/N. E00522
Water Temp ref : S/N. 11431
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)	9.08	(PASS)	-
Measurement 5 (mg/l)	9.08	(PASS)	-
Measurement 6 (mg/l)	9.08	(PASS)	-
Measurement 7 (mg/l)	9.08	(PASS)	-
Measurement 8 (mg/l)	9.08	(PASS)	-
Measurement 9 (mg/l)	9.08	(PASS)	-
Measurement 10 (mg/l)	9.08	(PASS)	-
Mean Measurement	9.08	mg/l	-
Inaccuracy	0.01	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 followed in accordance with Harikul Science Co., Ltd.
- 3) This result shall not be used for advertising purpose.



CERTIFICATE No : 22M2569
REFERENCE No : 64386-3

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 : TETNITHI W.
CALIBRATION DATE : 11-Mar-22

APPROVED BY :

ISSUED DATE : 17-Mar-22

RECEIVED DATE : 11-Mar-22



CERTIFICATE No : 22M2569

PAGE : 2 OF 2

Calibration Report

EQUIPMENT : DIGITAL BALANCE MODEL : BSA224S-CW
MANUFACTURER : SARTORIUS S/N : 36591843
ID No : BA 09/61 RECEIVED DATE : 11-Mar-22
AIR PRESSURE : 1008mbar \pm 1mbar CALIBRATION DATE : 11-Mar-22
AMBIENT TEMPERATURE : 22°C \pm 1°C RELATIVE HUMIDITY : 51 %RH \pm 10 % RH

CONDITION OF THIS RESULTS OF CALIBRATION

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

2. REFERENCE STANDARD INSTRUMENTS :-

INSTRUMENT	MODEL	SERIAL No	CERTIFICATE No	DUE DATE
1) STANDARD WEIGHT SET	E2	QK-I-151	C02210415	09-Feb-23

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

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

5. THIS CERTIFICATE IS TRACEABLE TO THE INTERNATIONAL SYSTEM OF UNIT MAINTAINED AT:-
- NATIONAL INSTITUTE OF METROLOGY (THAILAND) THROUGH CENTRAL BUREAU OF WEIGHTS&MEASURES

RESULT OF CALIBRATION :- WITHOUT ADJUSTMENT

1. ZERO SETTING FUNCTION : NORMAL

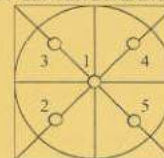
2. TARE FUNCTION : NORMAL

3. REPEATABILITY OF READING AT 200 g WAS 0.000048 g

4. DEPARTURE FROM NOMINAL VALUE/ LINEARITY

NOMINAL VALUE (g)	BALANCE READING (g)	CORRECTION (g)	UNCERTAINTY (\pm g)
0.00	0.0000	0.0000	0.000078
0.10	0.1000	0.0000	0.000078
0.20	0.2000	0.0000	0.000078
0.50	0.5000	0.0000	0.000079
1.00	1.0000	0.0000	0.000079
2.00	2.0000	0.0000	0.000080
5.00	5.0000	0.0000	0.000081
10.00	10.0000	0.0000	0.000084
20.00	20.0000	0.0000	0.000089
50.00	50.0000	0.0000	0.00011
100.00	100.0000	0.0000	0.00019
200.00	199.9999	0.0001	0.00032

5. OFF CENTER LOADING ERROR



POINT	READING (g)
1	99.9999
2	99.9999
3	100.0000
4	99.9999
5	99.9998
OFF-CENTER LOADING	0.0001

NOTE: THIS CALIBRATION WAS CARRIED OUT AT THE CUSTOMER'S PLACE AT PRODUCTION 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



CERTIFICATE No : 23M2442
REFERENCE No : 68471-2

PAGE : 1 OF 2

Certificate of Calibration

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

CALIBRATED BY : ATSAWIN Y.
CALIBRATION DATE : 10-Mar-23
APPROVED BY :
ISSUED DATE : 16-Mar-23
RECEIVED DATE : 10-Mar-23

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



CERTIFICATE No : 23M2442

PAGE : 2 OF 2

Calibration Report

EQUIPMENT : DIGITAL BALANCE MODEL : BSA224S-CW
MANUFACTURER : SARTORIUS S/N : 36591843
ID No : BA 09/61 RECEIVED DATE : 10-Mar-23
AIR PRESSURE : 1010mbar \pm 1mbar CALIBRATION DATE : 10-Mar-23
AMBIENT TEMPERATURE : 23°C \pm 1°C RELATIVE HUMIDITY : 49%RH \pm 10% RH

CONDITION OF THIS RESULTS OF CALIBRATION

1. THIS INSTRUMENT WAS CALIBRATED BY ACCORDING TO UKAS LAB 14 EDITION 6:2019 BY USING KNOWN WEIGHT STANDARD WEIGHT. THE BALANCE WAS 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 LINEARITY TEST. OFF-CENTER LOADING WAS MEASURED BY USING STANDARD WEIGHTS PLACED ON THE PAN AND MOVED TO VARIOUS POSITIONS ON THE PAN.
2. REFERENCE STANDARD INSTRUMENTS :-

INSTRUMENT	MODEL	SERIAL No	CERTIFICATE No	DUE DATE
1) STANDARD WEIGHT SET	E2	QK-1-151	M2302013S	02-Feb-25
2) STANDARD WEIGHT	E2	15843	M2302014S	02-Feb-25
3. THIS RESULT WAS FOUND ACCURATE AS SHOWN ON DATE AND PLACE OF CALIBRATION ONLY.
4. THIS RESULT EXCLUDE LONG TERM STABILITY OF THE UNIT UNDER CALIBRATION.
5. THIS CERTIFICATE IS TRACEABLE TO THE INTERNATIONAL SYSTEM OF UNIT MAINTAINED AT:-
- NATIONAL INSTITUTE OF METROLOGY (THAILAND) THROUGH CENTRAL BUREAU OF WEIGHTS&MEASURES

RESULT OF CALIBRATION :- WITHOUT ADJUSTMENT

1. ZERO SETTING FUNCTION : NORMAL
2. TARE FUNCTION : NORMAL
3. REPEATABILITY OF READING AT 200 g WAS 0 g
4. DEPARTURE FROM NOMINAL VALUE/ LINEARITY

NOMINAL VALUE (g)	BALANCE READING (g)	CORRECTION (g)	UNCERTAINTY (\pm g)
0.0	0.0000	0.0000	0.000038
0.1	0.1000	0.0000	0.000059
0.2	0.2000	0.0000	0.000059
0.5	0.5000	0.0000	0.000060
1.0	1.0000	0.0000	0.000060
2.0	2.0000	0.0000	0.000061
5.0	5.0000	0.0000	0.000063
10.0	10.0000	0.0000	0.000067
20.0	20.0001	-0.0001	0.000073
50.0	50.0000	0.0000	0.00011
100.0	100.0001	-0.0001	0.00019
200.0	200.0000	0.0000	0.00032

5. OFF CENTER LOADING ERROR



POINT	READING (g)
1	100.0000
2	99.9999
3	99.9998
4	100.0001
5	100.0000
OFF-CENTER LOADING	0.0002

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