

High-Volume TSP Sampler
5-Point Calibration Record

Location : ASR 5
 Calibrated by : P.F. Yeung
 Date : 11/04/2017

Sampler

Model : TE-5170
 Serial Number : S/N 0816

Calibration Orifice and Standard Calibration Relationship

Serial Number : 2454
 Service Date : 20 March 2017
 Slope (m) : 2.08464
 Intercept (b) : -0.036840
 Correlation Coefficient(r) : 0.99994

Standard Condition

Pstd (hpa) : 1013
 Tstd (K) : 298.18

Calibration Condition

Pa (hpa) : 1010
 Ta(K) : 300

Resistance Plate	dH [green liquid] (inch water)	Z	X=Qstd (cubic meter/min)	IC (chart)	Y (corrected)
1 18 holes	10.8	3.271	1.587	54	53.74
2 13 holes	7.8	2.779	1.351	46	45.78
3 10 holes	5.5	2.334	1.137	40	39.81
4 7 holes	3.7	1.914	0.936	33	32.84
5 5 holes	2.3	1.509	0.742	26	25.87

Notes: $Z = \sqrt{dH(Pa/Pstd)(Tstd/Ta)}$, $X = Z/m - b$, $Y(\text{Corrected Flow}) = IC * \{\sqrt{Pa/Pstd}(Tstd/Ta)\}$

Sampler Calibration Relationship (Linear Regression)

Slope(m): 32.599 Intercept(b): 2.104 Correlation Coefficient(r): 0.9992

Checked by: Magnum Fan

Date: 18/04/2017

High-Volume TSP Sampler
5-Point Calibration Record

Location : ASR10
 Calibrated by : P.F. Yeung
 Date : 11/04/2017

Sampler

Model : TE-5170
 Serial Number : S/N 8162

Calibration Orifice and Standard Calibration Relationship

Serial Number : 2454
 Service Date : 20 March 2017
 Slope (m) : 2.08464
 Intercept (b) : -0.036840
 Correlation Coefficient(r) : 0.99994

Standard Condition

Pstd (hpa) : 1013
 Tstd (K) : 298.18

Calibration Condition

Pa (hpa) : 1010
 Ta(K) : 300

Resistance Plate		dH [green liquid] (inch water)	Z	X=Qstd (cubic meter/min)	IC (chart)	Y (corrected)
1	18 holes	11.1	3.316	1.608	58	57.72
2	13 holes	8.3	2.867	1.393	51	50.75
3	10 holes	5.6	2.355	1.147	44	43.79
4	7 holes	3.8	1.940	0.948	37	36.82
5	5 holes	2.2	1.476	0.726	30	29.86

Notes: $Z = \sqrt{dH(Pa/Pstd)(Tstd/Ta)}$, $X = Z/m - b$, $Y(\text{Corrected Flow}) = IC * \{\sqrt{Pa/Pstd}(Tstd/Ta)\}$

Sampler Calibration Relationship (Linear Regression)

Slope(m): 31.503 Intercept(b): 7.103 Correlation Coefficient(r): 0.9996

Checked by: Magnum Fan

Date: 18/04/17

High-Volume TSP Sampler
5-Point Calibration Record

Location : AQMS1
 Calibrated by : P.F. Yeung
 Date : 11/04/2017

Sampler

Model : TE-5170
 Serial Number : S/N 1253

Calibration Orifice and Standard Calibration Relationship

Serial Number : 2454
 Service Date : 20 March 2017
 Slope (m) : 2.08464
 Intercept (b) : -0.036840
 Correlation Coefficient(r) : 0.99994

Standard Condition

Pstd (hpa) : 1013
 Tstd (K) : 298.18

Calibration Condition

Pa (hpa) : 1010
 Ta(K) : 300

Resistance Plate	dH [green liquid] (inch water)	Z	X=Qstd (cubic meter/min)	IC (chart)	Y (corrected)
1 18 holes	12.5	3.519	1.705	52	51.75
2 13 holes	9.6	3.083	1.497	45	44.78
3 10 holes	7.2	2.670	1.299	40	39.81
4 7 holes	4.4	2.088	1.019	32	31.85
5 5 holes	2.3	1.509	0.741	24	23.88

Notes: $Z = \sqrt{dH(Pa/Pstd)(Tstd/Ta)}$, $X = Z/m - b$, $Y(\text{Corrected Flow}) = IC * \{\sqrt{Pa/Pstd}(Tstd/Ta)\}$

Sampler Calibration Relationship (Linear Regression)

Slope(m): 25.528 Intercept(b): 2.687 Correlation Coefficient(r): 0.9994

Checked by: Magnum Fan

Date: 18/04/2017

High-Volume TSP Sampler
5-Point Calibration Record

Location : ASR 1
 Calibrated by : P.F. Yeung
 Date : 11/04/2017

Sampler

Model : TE-5170
 Serial Number : S/N 0146

Calibration Orifice and Standard Calibration Relationship

Serial Number : 2454
 Service Date : 20 March 2017
 Slope (m) : 2.08464
 Intercept (b) : -0.036840
 Correlation Coefficient(r) : 0.99994

Standard Condition

Pstd (hpa) : 1013
 Tstd (K) : 298.18

Calibration Condition

Pa (hpa) : 1010
 Ta(K) : 300

Resistance Plate	dH [green liquid] (inch water)	Z	X=Qstd (cubic meter/min)	IC (chart)	Y (corrected)
1 18 holes	10.2	3.178	1.542	52	51.75
2 13 holes	7.8	2.779	1.351	45	44.78
3 10 holes	5.4	2.313	1.127	38	37.82
4 7 holes	3.6	1.888	0.923	32	31.85
5 5 holes	2.2	1.476	0.726	25	24.88

Notes: $Z = \sqrt{dH(Pa/Pstd)(Tstd/Ta)}$, $X = Z/m - b$, $Y(\text{Corrected Flow}) = IC * \{\sqrt{Pa/Pstd}(Tstd/Ta)\}$

Sampler Calibration Relationship (Linear Regression)

Slope(m): 32.340 Intercept(b): 1.545 Correlation Coefficient(r): 0.9994

Checked by: Magnum Fan

Date: 18/04/2017

High-Volume TSP Sampler
5-Point Calibration Record

Location : ASR 6
 Calibrated by : P.F. Yeung
 Date : 11/04/2017

Sampler

Model : TE-5170
 Serial Number : S/N 3957

Calibration Orifice and Standard Calibration Relationship

Serial Number : 2454
 Service Date : 20 March 2017
 Slope (m) : 2.08464
 Intercept (b) : -0.036840
 Correlation Coefficient(r) : 0.99994

Standard Condition

Pstd (hpa) : 1013
 Tstd (K) : 298.18

Calibration Condition

Pa (hpa) : 1010
 Ta(K) : 300

Resistance Plate	dH [green liquid] (inch water)	Z	X=Qstd (cubic meter/min)	IC (chart)	Y (corrected)
1 18 holes	11.8	3.419	1.658	52	51.75
2 13 holes	9.0	2.986	1.450	46	45.78
3 10 holes	6.2	2.478	1.206	40	39.81
4 7 holes	4.0	1.990	0.972	34	33.84
5 5 holes	2.6	1.605	0.787	28	27.87

Notes: $Z = \sqrt{dH(Pa/Pstd)(Tstd/Ta)}$, $X = Z/m - b$, $Y(\text{Corrected Flow}) = IC * \{\sqrt{Pa/Pstd}(Tstd/Ta)\}$

Sampler Calibration Relationship (Linear Regression)

Slope(m): 26.875 Intercept(b): 7.162 Correlation Coefficient(r):
0.9990

Checked by: Magnum Fan

Date: 18/04/2017



TISCH ENVIRONMENTAL, INC.
 145 SOUTH MIAMI AVE
 VILLAGE OF CLEVELAND, OH
 45002
 513.467.9000
 877.263.7610 TOLL FREE
 513.467.9009 FAX

ORIFICE TRANSFER STANDARD CERTIFICATION WORKSHEET TE-5025A

Date - Mar 20, 2017 Rootsmeter S/N 0438320 Ta (K) - 293
 Operator Tisch Orifice I.D. - 2454 Pa (mm) - 759.46

PLATE OR Run #	VOLUME START (m3)	VOLUME STOP (m3)	DIFF VOLUME (m3)	DIFF TIME (min)	METER	ORFICE
					DIFF Hg (mm)	DIFF H2O (in.)
1	NA	NA	1.00	1.4390	3.2	2.00
2	NA	NA	1.00	1.0240	6.4	4.00
3	NA	NA	1.00	0.9170	7.9	5.00
4	NA	NA	1.00	0.8730	8.8	5.50
5	NA	NA	1.00	0.7200	12.8	8.00

DATA TABULATION

Vstd	(x axis) Qstd	(y axis)	Va	(x axis) Qa	(y axis)
1.0120	0.7033	1.4257	0.9958	0.6920	0.8784
1.0078	0.9842	2.0163	0.9916	0.9683	1.2423
1.0057	1.0967	2.2543	0.9895	1.0791	1.3889
1.0045	1.1507	2.3643	0.9884	1.1322	1.4567
0.9992	1.3878	2.8514	0.9831	1.3654	1.7568
Qstd slope (m) = 2.08464			Qa slope (m) = 1.30537		
intercept (b) = -0.03684			intercept (b) = -0.02270		
coefficient (r) = 0.99994			coefficient (r) = 0.99994		
y axis = SQRT[H2O(Pa/760) (298/Ta)]			y axis = SQRT[H2O(Ta/Pa)]		

CALCULATIONS

Vstd = Diff. Vol [(Pa-Diff. Hg)/760] (298/Ta)
 Qstd = Vstd/Time

Va = Diff Vol [(Pa-Diff Hg)/Pa]
 Qa = Va/Time

For subsequent flow rate calculations:

Qstd = 1/m{ [SQRT(H2O(Pa/760) (298/Ta))] - b}
 Qa = 1/m{ [SQRT H2O(Ta/Pa)] - b}

ENVIROTECH SERVICES CO.

Calibration Report of Wind Meter

Date of Calibration : 18 April 2017

Brand of Test Meter: Davis

Model: Vantage Pro 2 (s/n: AS160104014)

Location : Roof of Tuen Mun Firestation

Procedures :

- 1. Wind Still Test: The wind speed sensor was hold by hand until it keep still
- 2. Wind Speed Test: The wind meter was on-site calibrated against the Anemometer
- 3. Wind Direction Test : The wind meter was on-site calibrated against the marine compass at four directions

Results:

Wind Still Test

Wind Speed (m/s)
0.00

Wind Speed Test

Davis (m/s)	Anemometer (m/s)
0.5	0.6
1.0	1.1
2.1	2.3

Wind Direction Test

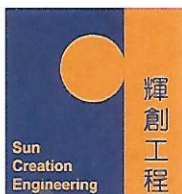
Davis (o)	Marine Compass (o)
269	270
359	0
91	90
180	180

Calibrated by: AP

Yeung Ping Fai
(Technical Officer)

Checked by : Fat

Ho Kam Fat
(Senior Technical Officer)



Certificate of Calibration 校正證書

Certificate No. : C165934
證書編號

ITEM TESTED / 送檢項目 (Job No. / 序引編號 : IC16-2438) Date of Receipt / 收件日期 : 26 October 2016

Description / 儀器名稱 : Anemometer
Manufacturer / 製造商 : Lutron
Model No. / 型號 : AM-4201
Serial No. / 編號 : AF.27513
Supplied By / 委託者 : Envirotech Services Co.
Room 113, 1/F, My Loft, 9 Hoi Wing Road, Tuen Mun,
New Territories, Hong Kong

TEST CONDITIONS / 測試條件

Temperature / 溫度 : $(23 \pm 2)^{\circ}\text{C}$ Relative Humidity / 相對濕度 : $(55 \pm 20)\%$
Line Voltage / 電壓 : ---

TEST SPECIFICATIONS / 測試規範


Calibration check

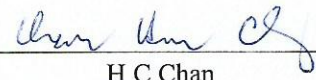
DATE OF TEST / 測試日期 : 27 October 2016

TEST RESULTS / 測試結果

The results apply to the particular unit-under-test only.
The results are detailed in the subsequent page(s).

The test equipment used for calibration are traceable to National Standards via :
- Testo Industrial Services GmbH, Germany

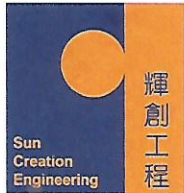
Tested By : 
測試 : _____
T L Shek
Assistant Engineer

Certified By : 
核證 : _____
H C Chan
Engineer

Date of Issue : 28 October 2016
簽發日期

The test equipment used for calibration are traceable to the Nation Standards as specified in this certificate. This certificate shall not be reproduced except in full, without the prior written approval of this laboratory.

本證書所載校正用之測試器材均可溯源至國際標準。局部複印本證書需先獲本實驗所書面批准。



輝創工程有限公司

Sun Creation Engineering Limited

Calibration and Testing Laboratory

Certificate of Calibration 校正證書

Certificate No. : C165934
證書編號

- The unit-under-test (UUT) was allowed to stabilize in the laboratory for over 12 hours before the commencement of the test.
- The results presented are the mean of 10 measurements at each calibration point.
- Test equipment :

<u>Equipment ID</u>	<u>Description</u>	<u>Certificate No.</u>
CL386	Multi-function Measuring Instrument	S12109

- Test procedure : MA130N.
- Results :

Air Velocity

Applied Value (m/s)	UUT Reading (m/s)	Measured Correction		
		Value (m/s)	Measurement Uncertainty	
			Expanded Uncertainty (m/s)	Coverage Factor
2.0	1.8	+0.2	0.2	2.0
4.0	3.8	+0.2	0.2	2.0
6.0	5.8	+0.2	0.3	2.0
8.1	8.0	+0.1	0.3	2.0
10.0	10.0	0.0	0.4	2.0

Remarks : - The Measured Corrections are defined as :
Value = Applied Value - UUT Reading

- The expanded uncertainties are for a level of confidence of 95 %.

Note :

Only the original copy or the laboratory's certified true copy is valid.

The values given in this Certificate only relate to the values measured at the time of the test and any uncertainties quoted will not include allowance for the equipment long term drift, variations with environment changes, vibration and shock during transportation, overloading, mis-handling, or the capability of any other laboratory to repeat the measurement. Sun Creation Engineering Limited shall not be liable for any loss or damage resulting from the use of the equipment.

The test equipment used for calibration are traceable to the Nation Standards as specified in this certificate. This certificate shall not be reproduced except in full, without the prior written approval of this laboratory.

本證書所載校正用之測試器材均可溯源至國際標準。局部複印本證書需先獲本實驗室書面批准。

Sun Creation Engineering Limited – Calibration & Testing Laboratory

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輝創工程有限公司 – 校正及檢測實驗室

c/o 香港新界屯門興安里一號青山灣機樓四樓

Tel/電話: 2927 2606

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Website/網址: www.suncreation.com



Internal Calibration Report of Dissolved Oxygen Meter

Equipment Ref. No. : <u>ET/EW/008/004</u>	Manufacturer : <u>YSI</u>
Model No. : <u>Pro 2030</u>	Serial No. : <u>10F 101978</u>
Date of Calibration : <u>19/04/2017</u>	Calibration Due Date : <u>18/07/2017</u>

Temperature Verification

Ref. No. of Reference Thermometer : ET/0521/017

Ref. No. of Water Bath : ---

		Temperature (°C)		
Reference Thermometer reading	Measured	19.9	Corrected	19.8
DO Meter reading	Measured	19.9	Difference	-0.1

Standardization of sodium thiosulphate (Na₂S₂O₃) solution

Reagent No. of Na ₂ S ₂ O ₃ titrant	CPE/012/4.5/001/15	Reagent No. of 0.025N K ₂ Cr ₂ O ₇	CPE/012/4.4/002/18
		Trial 1	Trial 2
Initial Vol. of Na ₂ S ₂ O ₃ (ml)		0.00	10.25
Final Vol. of Na ₂ S ₂ O ₃ (ml)		10.25	20.45
Vol. of Na ₂ S ₂ O ₃ used (ml)		10.25	10.20
Normality of Na ₂ S ₂ O ₃ solution (N)		0.02439	0.02451
Average Normality (N) of Na ₂ S ₂ O ₃ solution (N)		0.02445	
Acceptance criteria, Deviation		Less than ± 0.001N	

Calculation: Normality of Na₂S₂O₃, N = 0.25 / ml Na₂S₂O₃ used

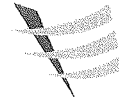
Linearity Checking

*Determination of dissolved oxygen content by Winkler Titration **

Purging Time (min)	2		5		10	
	1	2	1	2	1	2
Trial						
Initial Vol. of Na ₂ S ₂ O ₃ (ml)	0.00	10.70	21.50	0.00	6.70	10.30
Final Vol. of Na ₂ S ₂ O ₃ (ml)	10.70	21.50	28.20	6.70	10.30	13.80
Vol. (V) of Na ₂ S ₂ O ₃ used (ml)	10.70	10.80	6.70	6.70	3.60	3.50
Dissolved Oxygen (DO), mg/L	7.02	7.09	4.40	4.40	2.36	2.30
Acceptance criteria, Deviation	Less than + 0.3mg/L		Less than + 0.3mg/L		Less than + 0.3mg/L	

Calculation: DO (mg/L) = V x N x 8000/298

Purging time, min	DO meter reading, mg/L			Winkler Titration result *, mg/L			Difference (%) of DO Content
	1	2	Average	1	2	Average	
2	7.22	7.28	7.25	7.02	7.09	7.06	2.66
5	4.31	4.29	4.30	4.40	4.40	4.40	2.30
10	2.29	2.27	2.28	2.36	2.30	2.33	2.17
Linear regression coefficient				0.9987			



Internal Calibration Report of Dissolved Oxygen Meter

Zero Point Checking

DO meter reading, mg/L	0.00
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Salinity Checking

Reagent No. of NaCl (10ppt)	CPE/012/4.7/003/37	Reagent No. of NaCl (30ppt)	CPE/012/4.8/003/37
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Determination of dissolved oxygen content by Winkler Titration **

Salinity (ppt)	10		30	
Trial	1	2	1	2
Initial Vol. of Na ₂ S ₂ O ₃ (ml)	0.00	10.60	21.10	30.30
Final Vol. of Na ₂ S ₂ O ₃ (ml)	10.60	21.10	30.30	39.50
Vol. (V) of Na ₂ S ₂ O ₃ used (ml)	10.60	10.50	9.20	9.20
Dissolved Oxygen (DO), mg/L	6.96	6.89	6.04	6.04
Acceptance criteria, Deviation	Less than + 0.3mg/L		Less than + 0.3mg/L	

Calculation: DO (mg/L) = V x N x 8000/298

Salinity (ppt)	DO meter reading, mg/L			Winkler Titration result**, mg/L			Difference (%) of DO Content
	1	2	Average	1	2	Average	
10	7.05	7.00	7.03	6.96	6.89	6.93	1.43
30	5.98	6.01	6	6.04	6.04	6.04	0.66

Acceptance Criteria

- (1) Difference between temperature readings from temperature sensor of DO probe and reference thermometer : < 0.5 °C
- (2) Linear regression coefficient : >0.99
- (3) Zero checking: 0.0mg/L
- (4) Difference (%) of DO content from the meter reading and by winkler titration : within ± 5%

The equipment complies # / ~~does not comply~~ # with the specified requirements and is deemed acceptable # / ~~unacceptable~~ # for use.

Delete as appropriate

Calibrated by : _____

Approved by : _____



Performance Check of Salinity Meter

Equipment Ref. No. : ET/EW/008/004 Manufacturer : YSI
Model No. : Pro 2030 Serial No. : 10F 101978
Date of Calibration : 19/04/2017 Due Date : 18/07/2017

Ref. No. of Salinity Standard used (30ppt)

S/001/9

Salinity Standard (ppt)	Measured Salinity (ppt)	Difference * (%)
30.0	30.8	2.7

(*) Difference (%) = (Measured Salinity – Salinity Standard value) / Salinity Standard value x 100

Acceptance Criteria

Difference : -10 % to 10 %

The salinity meter complies * / ~~does not comply~~ * with the specified requirements and is deemed acceptable * / ~~unacceptable~~ * for use. Measurements are traceable to national standards.

Checked by : _____ 

Approved by : _____ 



Internal Calibration Report of Dissolved Oxygen Meter

Equipment Ref. No. : <u>ET/EW/008/008</u>	Manufacturer : <u>YSI</u>
Model No. : <u>Pro 2030</u>	Serial No. : <u>14M101489</u>
Date of Calibration : <u>22/04/2017</u>	Calibration Due Date : <u>21/07/2017</u>

Temperature Verification

Ref. No. of Reference Thermometer : ET/0521/017

Ref. No. of Water Bath : ---

		Temperature (°C)		
Reference Thermometer reading	Measured	20.3	Corrected	19.8
DO Meter reading	Measured	19.7	Difference	0.1

Standardization of sodium thiosulphate (Na₂S₂O₃) solution

Reagent No. of Na ₂ S ₂ O ₃ titrant	CPE/012/4.5/001/15	Reagent No. of 0.025N K ₂ Cr ₂ O ₇	CPE/012/4.4/002/18
		Trial 1	Trial 2
Initial Vol. of Na ₂ S ₂ O ₃ (ml)		0.00	10.15
Final Vol. of Na ₂ S ₂ O ₃ (ml)		10.15	20.35
Vol. of Na ₂ S ₂ O ₃ used (ml)		10.15	10.20
Normality of Na ₂ S ₂ O ₃ solution (N)		0.02463	0.02451
Average Normality (N) of Na ₂ S ₂ O ₃ solution (N)		0.02457	
Acceptance criteria, Deviation		Less than ± 0.001N	

Calculation: Normality of Na₂S₂O₃, N = 0.25 / ml Na₂S₂O₃ used

Lineality Checking

*Determination of dissolved oxygen content by Winkler Titration **

Purging Time (min)	2		5		10	
	1	2	1	2	1	2
Initial Vol. of Na ₂ S ₂ O ₃ (ml)	0.00	10.90	21.80	0.00	6.80	10.60
Final Vol. of Na ₂ S ₂ O ₃ (ml)	10.90	21.80	28.60	6.80	10.60	14.50
Vol. (V) of Na ₂ S ₂ O ₃ used (ml)	10.90	10.90	6.80	6.80	3.80	3.90
Dissolved Oxygen (DO), mg/L	7.19	7.19	4.49	4.49	2.51	2.57
Acceptance criteria, Deviation	Less than + 0.3mg/L		Less than + 0.3mg/L		Less than + 0.3mg/L	

Calculation: DO (mg/L) = V x N x 8000/298

Purging time, min	DO meter reading, mg/L			Winkler Titration result *, mg/L			Difference (%) of DO Content
	1	2	Average	1	2	Average	
2	7.23	7.19	7.21	7.19	7.19	7.19	0.28
5	4.43	4.40	4.42	4.49	4.49	4.49	1.57
10	2.48	2.51	2.50	2.51	2.57	2.54	1.59
Linear regression coefficient				0.9998			

Internal Calibration Report of Dissolved Oxygen Meter

Zero Point Checking

DO meter reading, mg/L	0.00
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Salinity Checking

Reagent No. of NaCl (10ppt)	CPE/012/4.7/004/1	Reagent No. of NaCl (30ppt)	CPE/012/4.8/004/1
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Determination of dissolved oxygen content by Winkler Titration **

Salinity (ppt)	10		30	
	1	2	1	2
Initial Vol. of Na ₂ S ₂ O ₃ (ml)	0.00	10.70	21.30	30.70
Final Vol. of Na ₂ S ₂ O ₃ (ml)	10.70	21.30	30.70	40.20
Vol. (V) of Na ₂ S ₂ O ₃ used (ml)	10.70	10.60	9.40	9.50
Dissolved Oxygen (DO), mg/L	7.06	6.99	6.20	6.27
Acceptance criteria, Deviation	Less than + 0.3mg/L		Less than + 0.3mg/L	

Calculation: $DO (mg/L) = V \times N \times 8000/298$

Salinity (ppt)	DO meter reading, mg/L			Winkler Titration result**, mg/L			Difference (%) of DO Content
	1	2	Average	1	2	Average	
10	7.00	6.97	6.99	7.06	6.99	7.03	0.57
30	6.07	6.11	6.09	6.20	6.27	6.24	2.43

Acceptance Criteria

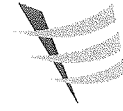
- (1) Difference between temperature readings from temperature sensor of DO probe and reference thermometer : < 0.5 °C
- (2) Linear regression coefficient : >0.99
- (3) Zero checking: 0.0mg/L
- (4) Difference (%) of DO content from the meter reading and by winkler titration : within ± 5%

The equipment complies # / ~~does not comply~~ # with the specified requirements and is deemed acceptable # / ~~unacceptable~~ # for use.

Delete as appropriate

Calibrated by : _____ 

Approved by : _____ 



Performance Check of Salinity Meter

Equipment Ref. No. : ET/EW/008/008 Manufacturer : YSI
Model No. : Pro 2030 Serial No. : 14M101489
Date of Calibration : 22/04/2017 Due Date : 21/07/2017

Ref. No. of Salinity Standard used (30ppt)

S/001/9

Salinity Standard Value (ppt)	Measured Salinity (ppt)	Difference * (%)
30.0	30.8	2.7

(*) Difference (%) = (Measured Salinity – Salinity Standard value) / Salinity Standard value x 100

Acceptance Criteria

Difference : -10 % to 10 %

The salinity meter complies * / ~~does not comply~~ * with the specified requirements and is deemed acceptable * / ~~unacceptable~~ * for use. Measurements are traceable to national standards.

Checked by : _____ 

Approved by : _____ 



Performance Check of Turbidity Meter

Equipment Ref. No. : ET/0505/014 Manufacturer : HACH
Model No. : 2100Q Serial No. : 13110C029448
Date of Calibration : 25/02/2017 Due Date : 24/05/2017

Theoretical Value of Turbidity Standard (NTU)	Measured Value (NTU)	Difference % *
20	20.4	2.0
100	98.2	-1.8
800	775	-3.1

(*) Difference = (Measured Value – Theoretical Value) / Theoretical Value x 100

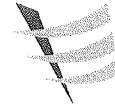
Acceptance Criteria

Difference : -5 % to 5 %

The turbidity meter complies * / ~~does not comply~~ * with the specified requirements and is deemed acceptable * / ~~unacceptable~~ * for use. Measurements are traceable to national standards.

Prepared by : *B. Li*

Checked by : *AL*



Performance Check of Turbidity Meter

Equipment Ref. No. : ET/0505/020 Manufacturer : HACH
Model No. : 2100Q Serial No. : 16100C053195
Date of Calibration : 28/03/2017 Due Date : 27/06/2017

Theoretical Value of Turbidity Standard (NTU)	Measured Value (NTU)	Difference % *
20	20.1	0.5
100	99.2	-0.8
800	776	-3.0

(*) Difference = (Measured Value – Theoretical Value) / Theoretical Value x 100

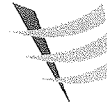
Acceptance Criteria

Difference : -5 % to 5 %

The turbidity meter complies * / ~~does not comply~~ * with the specified requirements and is deemed acceptable * / ~~unacceptable~~ * for use. Measurements are traceable to national standards.

Prepared by : 

Checked by : 



Internal Calibration & Performance Check of pH Meter

Equipment Ref. No. : ET/EW/007/008 Manufacturer : HANNA
 Model No. : HI9125 Serial No. : H0040409
 Date of Calibration : 29/04/2017 Calibration Due Date : 28/05/2017

Liquid Junction Error

003/5.2/002/09 (20°C)

Primary Standard Solution Used : Phosphate Ref No. of Primary Solution: 003/5.2/002/10 (25°C)
 Temperature of Solution : 25.0 / 20.0 $\Delta\text{pH}_{1/2} =$ 0.080 / 0.080
 pH value of diluted buffer : 6.98 / 7.00 $\text{pH (S)} =$ 6.865 / 6.881
 $\Delta\text{pH} = \text{pH(S)} - \text{pH of diluted buffer} =$ 0.115 / 0.119 (Observed Deviation)
 Liquid Junction Error (ΔpH_j) = $\Delta\text{pH} - \Delta\text{pH}_{1/2} =$ 0.04 / 0.04

Shift on Stirring

pH of buffer solution (with stirring), $\text{pH}_s =$ 6.91 / 6.93
 Shift on stirring, $\Delta\text{pH}_s = \text{pH}_s - \text{pH(S)} - \Delta\text{pH}_j =$ 0.01 / 0.01

Noise

Noise, $\Delta\text{pH}_n =$ difference between max and min reading : 0.01 / 0.01

Verification of ATC

Ref. No. of reference thermometer used: ET/0521/018 / ET/0521/019
 Temperature record from the reference thermometer (T_R): 25.0 / 20.0 °C
 Temperature record from the ATC (T_{ATC}): 24.9 / 19.9 °C
 Temperature Difference, $|T_R - T_{ATC}|$ 0.1 / 0.1 °C
 Correction +0.1 / +0.1 °C

Acceptance Criteria

Performance Characteristic	Acceptable Range
Liquid Junction Error ΔpH_j	≤ 0.05
Shift on Stirring ΔpH_s	≤ 0.02
Noise ΔpH_n	≤ 0.02
Verification of ATC Temperature Difference	$\leq 0.5^\circ\text{C}$

The pH meter complies * / does not comply * with the specified requirements and is deemed acceptable * / unacceptable * for use. Measurements are traceable to national standards.

* Delete as appropriate

Calibrated by: Bearw

Checked by: [Signature]



Internal Calibration & Performance Check of pH Meter

Equipment Ref. No. : ET/EW/007/008 Manufacturer : HANNA
 Model No. : HI9125 Serial No. : H0040409
 Date of Calibration : 29/05/2017 Calibration Due Date : 28/06/2017

Liquid Junction Error

003/5.2/002/11 (20°C)

Primary Standard Solution Used : Phosphate Ref No. of Primary Solution: 003/5.2/002/10 (25°C)
 Temperature of Solution : 25.0 / 20.0 $\Delta\text{pH}_{1/2} =$ 0.080 / 0.080
 pH value of diluted buffer : 6.98 / 7.00 $\text{pH (S)} =$ 6.865 / 6.881
 $\Delta\text{pH} = \text{pH(S)} - \text{pH of diluted buffer} =$ 0.115 / 0.119 (Observed Deviation)
 Liquid Junction Error (ΔpH_j) = $\Delta\text{pH} - \Delta\text{pH}_{1/2} =$ 0.04 / 0.04

Shift on Stirring

pH of buffer solution (with stirring), $\text{pH}_s =$ 6.90 / 6.92
 Shift on stirring, $\Delta\text{pH}_s = \text{pH}_s - \text{pH(S)} - \Delta\text{pH}_j =$ 0.00 / 0.00

Noise

Noise, $\Delta\text{pH}_n =$ difference between max and min reading : 0.01 / 0.01

Verification of ATC

Ref. No. of reference thermometer used: ET/0521/022 / ET/0521/019
 Temperature record from the reference thermometer (T_R): 25.0 / 20.0 °C
 Temperature record from the ATC (T_{ATC}): 24.9 / 19.9 °C
 Temperature Difference, $|T_R - T_{ATC}|$ 0.1 / 0.1 °C
 Correction +0.1 / +0.1 °C

Acceptance Criteria

Performance Characteristic	Acceptable Range
Liquid Junction Error ΔpH_j	≤ 0.05
Shift on Stirring ΔpH_s	≤ 0.02
Noise ΔpH_n	≤ 0.02
Verification of ATC Temperature Difference	$\leq 0.5^\circ\text{C}$

The pH meter complies * / does not comply * with the specified requirements and is deemed acceptable * / unacceptable * for use. Measurements are traceable to national standards.

* Delete as appropriate

Calibrated by: Benny

Checked by: [Signature]