### <u>High-Volume TSP Sampler</u> <u>5-Point Calibration Record</u>

Location : ASR 5
Calibrated by : P.F.Yeung
Date : 10/04/2015

Sampler

 Model
 :
 TE-5170

 Serial Number
 :
 S/N 0816

Calibration Orfice and Standard Calibration Relationship

Serial Number : 2454

 Service Date
 : 24 Mar 2015

 Slope (m)
 : 2.09532

 Intercept (b)
 : -0.03812

 Correlation Coefficient(r)
 : 0.99994

**Standard Condition** 

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

Calibration Condition

Pa (hpa) : 1013 Ta(K) : 295

Resistance Plate		dH [green liquid]	Z	X=Qstd	IC	Y
		(inch water)		(cubic meter/min)	(chart)	(corrected)
1	18 holes	12.0	3.482	1.680	52	52.26
2	13 holes	9.6	3.114	1.504	47	47.24
3	10 holes	7.0	2.659	1.287	40	40.20
4	7 holes	4.4	2.108	1.024	32	32.16
5	5 holes	2.7	1.652	0.806	24	24.12

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

### Sampler Calibration Relationship (Linear Regression)

Slope(m): 32.076 Intercept(b): 1.232 Correlation Coefficient(r): 0.9993

### <u>High-Volume TSP Sampler</u> <u>5-Point Calibration Record</u>

Location : ASR10
Calibrated by : P.F.Yeung
Date : 10/04/2015

Sampler

 Model
 :
 TE-5170

 Serial Number
 :
 S/N 8162

Calibration Orfice and Standard Calibration Relationship

Serial Number : 2454

 Service Date
 : 24 Mar 2015

 Slope (m)
 : 2.09532

 Intercept (b)
 : -0.03812

 Correlation Coefficient(r)
 : 0.99994

**Standard Condition** 

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

Calibration Condition

Pa (hpa) : 1013 Ta(K) : 295

Resistance Plate		dH [green liquid]	Z	X=Qstd	IC	Y
		(inch water)		(cubic meter/min)	(chart)	(corrected)
1	18 holes	11.6	3.423	1.652	58	58.29
2	13 holes	9.0	3.015	1.457	52	52.26
3	10 holes	6.8	2.621	1.269	44	44.22
4	7 holes	4.4	2.108	1.024	36	36.18
5	5 holes	2.8	1.682	0.821	28	28.14

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

### Sampler Calibration Relationship (Linear Regression)

Slope(m): 36.442 Intercept(b): -1.537 Correlation Coefficient(r): 0.9991

### <u>High-Volume TSP Sampler</u> <u>5-Point Calibration Record</u>

Location : AQMS1
Calibrated by : P.F.Yeung
Date : 10/04/2015

Sampler

 Model
 :
 TE-5170

 Serial Number
 :
 S/N 1253

Calibration Orfice and Standard Calibration Relationship

 Serial Number
 : 2454

 Service Date
 : 24 Mar 2015

 Slope (m)
 : 2.09532

 Intercept (b)
 : -0.03812

 Correlation Coefficient(r)
 : 0.99994

**Standard Condition** 

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

Calibration Condition

Pa (hpa) : 1013 Ta(K) : 295

Resistance Plate		dH [green liquid]	Z	X=Qstd	IC	Y
		(inch water)		(cubic meter/min)	(chart)	(corrected)
1	18 holes	12.0	3.482	1.680	50	50.25
2	13 holes	9.4	3.081	1.489	44	44.22
3	10 holes	7.0	2.659	1.287	38	38.19
4	7 holes	4.4	2.108	1.024	30	30.15
5	5 holes	2.6	1.621	0.792	24	24.12

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

### Sampler Calibration Relationship (Linear Regression)

Slope(m):26.569 Intercept(b): 0.297 Correlation Coefficient(r): 0.9995

### <u>High-Volume TSP Sampler</u> 5-Point Calibration Record

Location : ASR 1
Calibrated by : P.F.Yeung
Date : 10/04/2015

Sampler

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

Calibration Orfice and Standard Calibration Relationship

Serial Number : 2454

 Service Date
 : 24 Mar 2015

 Slope (m)
 : 2.09532

 Intercept (b)
 : -0.03812

 Correlation Coefficient(r)
 : 0.99994

**Standard Condition** 

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

Calibration Condition

Pa (hpa) : 1013 Ta(K) : 295

Resistance Plate		dH [green liquid]	Z	X=Qstd	IC	Y
		(inch water)		(cubic meter/min)	(chart)	(corrected)
1	18 holes	11.8	3.453	1.666	56	56.28
2	13 holes	9.2	3.049	1.473	49	49.25
3	10 holes	6.8	2.621	1.269	42	42.21
4	7 holes	4.8	2.202	1.069	35	35.18
5	5 holes	2.7	1.652	0.806	25	25.13

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

### Sampler Calibration Relationship (Linear Regression)

Slope(m):36.016 Intercept(b): -3.652 Correlation Coefficient(r): 0.9998

# High-Volume TSP Sampler 5-Point Calibration Record

Location : ASR 6
Calibrated by : P.F.Yeung
Date : 10/04/2015

Sampler

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

Calibration Orfice and Standard Calibration Relationship

Serial Number : 2454

 Service Date
 : 24 Mar 2015

 Slope (m)
 : 2.09532

 Intercept (b)
 : -0.03812

 Correlation Coefficient(r)
 : 0.99994

**Standard Condition** 

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

Calibration Condition

Pa (hpa) : 1013 Ta(K) : 295

Resistance Plate		dH [green liquid]	Z	X=Qstd	IC	Y
		(inch water)		(cubic meter/min)	(chart)	(corrected)
1	18 holes	12.4	3.539	1.707	54	54.27
2	13 holes	9.8	3.146	1.520	48	48.24
3	10 holes	7.2	2.697	1.305	41	41.21
4	7 holes	4.6	2.156	1.047	34	34.17
5	5 holes	2.8	1.682	0.821	26	26.13

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

### Sampler Calibration Relationship (Linear Regression)

Slope(m): 31.297 Intercept(b): 0.744 Correlation Coefficient(r): 0.9993

## ENVIROTECH SERVICES CO.

## **Calibration Report of Wind Meter**

Date of Canoration :	29 December 2014
Brand of Test Meter:	Davis
Model:	Weather Wizard III (s/n: WE90911A30)
Location:	ASR5
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)	
á	0.00	

### Wind Speed Test

Davis (m/s)	Anemomete (m/s)
1.4	1.6
1.9	1.7
2.4	2.5

### Wind Direction Test

. 2	Davis (o)	* 4	Marine Compass (o)		
	271		270		
, .	0	. 8	0		
	91	il god	90		
	179	*	180		

Calibrated by:

Yeung Ping Fai

(Technical Officer)

Checked by:

Ho Kam Fat

(Senior Technical Officer)



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

# ORIFICE TRANSFER STANDARD CERTIFICATION WORKSHEET TE-5025A

Date - Ma Operator		Rootsmeter Orifice I.I		438320 2454	Pa (MM) -	756.92
PLATE OR Run # 1 2 3 4 5	VOLUME START (m3)  NA NA NA NA NA NA	VOLUME STOP (m3)  NA NA NA NA NA NA	DIFF VOLUME (m3)  1.00 1.00 1.00 1.00	DIFF TIME (min)  1.4460 1.0300 0.9180 0.8780 0.7240	METER DIFF Hg (mm) 3.2 6.4 7.9 8.7 12.6	ORFICE DIFF H2O (in.)  2.00 4.00 5.00 5.50 8.00

### DATA TABULATION

Vstd	(x axis) Qstd	(y axis)		Va	(x axis) Qa	(y axis)	
1.0121 1.0078 1.0057 1.0047 0.9994	0.6999 0.9785 1.0955 1.1443 1.3805	1.4258 2.0163 2.2543 2.3644 2.8515		0.9958 0.9916 0.9895 0.9885 0.9833	0.6886 0.9627 1.0779 1.1258 1.3582	0.8784 1.2422 1.3888 1.4566 1.7568	
Qstd slop intercept coefficie	t (b) =	2.09532 -0.03812 0.99994		Qa slop intercep coeffici	t (b) =	1.31205 -0.02349 0.99994	
y axis =	SQRT [H20 (	Pa/760)(298/	Ta)]	y axis =	SQRT [H20 (	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 =  $1/m\{ [SQRT H2O(Ta/Pa)] - b\}$ 



# 輝創工程有限公司

### Sun Creation Engineering Limited

Calibration and Testing Laboratory

# Certificate of Calibration

Certificate No.: C146966

證書編號

校正證書

ITEM TESTED / 送檢項目 (Job No. / 序引編號: IC14-2877) Date of Receipt / 收件日期: 12 November 2014

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.

Shop 6, G/F., Casio Mansion, 209 Shaukeiwan Road,

Hong Kong

TEST CONDITIONS / 測試條件

Temperature / 溫度 :  $(23 \pm 2)^{\circ}$ 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

14 November 2014

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

CF Leung Project Engineer

Certified By

核證

Date of Issue

18 November 2014

Engineer

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。

Sun Creation Engineering Limited - Calibration & Testing Laboratory c/o 4/F, Tsing Shan Wan Exchange Building, 1 Hing On Lane, Tuen Mun, New Territories, Hong Kong

輝創工程有限公司 - 校正及檢測實驗所 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 Fax/傳真: 2744 8986 E-mail/電郵: callab(a)suncreation.com

Website/網址· www.suncreation.com



## 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.:

C146966

證書編號

1. The unit-under-test (UUT) was allowed to stabilize in the laboratory for over 12 hours before the commencement of the test.

2. The results presented are the mean of 10 measurements at each calibration point.

3. Test equipment:

Equipment ID

Description

Certificate No.

CL386

Multi-function Measuring Instrument

S12109

Test procedure : MA130N.

5. Results:

Air Velocity

Applied	UUT	Measured Correction				
Value	Reading	Value Measurement Uncertainty				
(m/s)	(m/s)	(m/s)	Expanded Uncertainty (m/s)	Coverage Factor		
2.0	1.7	+0.3	0.2	2.0		
4.1	3.8	+0.3	0.3	2.0		
6.1	5.8	+0.3	0.3	2.0		
8.0	7.8	+0.2	0.3	2.0		
10.0	9.9	+0.1	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:

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所書面批准。

Sun Creation Engineering Limited – Calibration & Testing Laboratory c'o 4/F, Tsing Shan Wan Exchange Building, 1 Hing On Lane, Tuen Mun, New Territories, Hong Kong 輝創工程有限公司 – 校正及檢測實驗所 c'o 香港新界屯門與安里一號青山灣機樓四樓

Tel/電話: 2927 2606 Fax/傳真: 2744 8986 E-mail/電郵: callab/a/suncreation.com Website/網址: www.suncreation.com



Equipment Ref. No.: ET/EW/007/005	n & Performance Check  Manufacturer	: HANNA	Handoodephyddiadayddiaday
Model No. : HI 8314	Serial No.		***********
Date of Calibration : 06/04/2015	_ Serial No. Calibration Due Date	: 8246095 : 05/05/2015	······································
	Calibration Due Date	: 05/05/2015	***************************************
Liquid Junction Error			
Primary Standard Solution Used : Phosp	phate Ref No. of	Primary Solution: 003/5.2	2/001/
Temperature of Solution : 20.0	- The state of the	$\Delta pH_{\frac{1}{2}} = +0.08$	
pH value of diluted buffer : 6.76		pH (S) = 6.881	
△pH = pH(S) - pH of diluted buffer = 0.121	(Observed Deviation	- · · · · · · · · · · · · · · · · · · ·	***************************************
Liquid Junction Error ( $\Delta pH_i$ ) = $\Delta pH - \Delta pH_{\frac{1}{2}}$ =			
			<del>annor amparen</del>
Shift on Stirring			
pH of buffer solution (with stirring), $pH_s =$	6.94		
Shift on stirring, $\triangle pH_s = pH_s - pH(S) - \triangle pH_j =$	0.018		
Noise			***************************************
Noise, $\Delta pH_n$ = difference between max and r	min reading:  0.00		
	Procedure and the second secon		
Verification of ATC			
Verification of ATC			
Verification of ATC  Ref. No. of reference thermometer used:	ET/0521/008		
Verification of ATC  Ref. No. of reference thermometer used:  Temperature record from the reference thermometer.	mometer (T <sub>R</sub> ): 19.9	°C	
Verification of ATC  Ref. No. of reference thermometer used:  Temperature record from the reference thermometer thermometer there.  Temperature record from the ATC (T <sub>ATC</sub> ):	mometer (T <sub>R</sub> ): 19.9 19.6	°C	
Verification of ATC  Ref. No. of reference thermometer used:  Temperature record from the reference thermometer.	mometer (T <sub>R</sub> ): 19.9	°C	
Verification of ATC  Ref. No. of reference thermometer used:  Temperature record from the reference thermometer thermometer there.  Temperature record from the ATC (T <sub>ATC</sub> ):	mometer (T <sub>R</sub> ): 19.9 19.6	°C	
Verification of ATC  Ref. No. of reference thermometer used: Temperature record from the reference thermometer thermometer record from the ATC (T <sub>ATC</sub> ): Temperature Difference,  T <sub>R</sub> - T <sub>ATC</sub>	19.9 19.6 0.3	° C ° C	
Verification of ATC  Ref. No. of reference thermometer used: Temperature record from the reference thermometer thermometer used: Temperature record from the ATC (T <sub>ATC</sub> ): Temperature Difference,  T <sub>R</sub> - T <sub>ATC</sub>    Acceptance Criteria	19.9 19.6 0.3	°C	
Verification of ATC  Ref. No. of reference thermometer used: Temperature record from the reference thermometer thermometer record from the ATC (T <sub>ATC</sub> ): Temperature Difference,  T <sub>R</sub> - T <sub>ATC</sub>    Acceptance Criteria  Performance Characterist	mometer (T <sub>R</sub> ): 19.9 19.6 0.3 tic Accepta	° C ° C ° C	
Verification of ATC         Ref. No. of reference thermometer used:         Temperature record from the reference thermometer the temperature record from the ATC ( $T_{ATC}$ ):         Temperature Difference, $ T_R - T_{ATC} $ Acceptance Criteria         Performance Characterist         Liquid Junction Error $\Delta pHj$ Shift on Stirring $\Delta pHs$ Noise $\Delta pHn$	19.9 19.6 0.3  cic Accepta	° C ° C ° C sible Range 0.05 0.02 0.02	
Verification of ATC         Ref. No. of reference thermometer used:         Temperature record from the reference thermometer the temperature record from the ATC ( $T_{ATC}$ ):         Temperature Difference, $ T_R - T_{ATC} $ Acceptance Criteria         Performance Characterist         Liquid Junction Error $\Delta pHj$ Shift on Stirring $\Delta pHs$ Noise $\Delta pHn$	19.9 19.6 0.3  cic Accepta	° C ° C ° C sible Range 0.05 0.02	
Verification of ATC         Ref. No. of reference thermometer used:         Temperature record from the ATC (T <sub>ATC</sub> ):         Temperature Difference,   T <sub>R</sub> - T <sub>ATC</sub>           Acceptance Criteria         Performance Characterist         Liquid Junction Error       ΔpHj         Shift on Stirring       ΔpHs         Noise       ΔpHn         Verification of ATC       Tempe         The pH meter complies * / does not compunacceptable * for use. Measurements are toward and the property of the property of the physical strength	mometer ( $T_R$ ): 19.9  19.6  0.3  sic Accepta $\leq$ rature Difference $\leq$ 0  Accepta $\leq$ return Difference $\leq$ 0  Accepta	° C ° C ° C sible Range 0.05 0.02 0.02 0.5°C	able '
Verification of ATC         Ref. No. of reference thermometer used:         Temperature record from the ATC (T <sub>ATC</sub> ):         Temperature Difference,   T <sub>R</sub> - T <sub>ATC</sub>           Acceptance Criteria         Performance Characterist         Liquid Junction Error       ΔpHj         Shift on Stirring       ΔpHs         Noise       ΔpHn         Verification of ATC       Tempe         The pH meter complies * / does not comp	mometer ( $T_R$ ): 19.9  19.6  0.3  sic Accepta $\leq$ rature Difference $\leq$ 0  Accepta $\leq$ return Difference $\leq$ 0  Accepta	° C ° C ° C sible Range 0.05 0.02 0.02 0.5°C	able <sup>3</sup>

CPERO IC.



	東業德勤別試顧問有限公司
	The Property of the Control of the C
Internal Calibration & Perfor	*** Form E/CE/L/15/Issue 2 (1/1) [04/1:
Equipment Ref. No. : ET/EW007/005 Man Model No. : Orion 2 Star Seri	nufacturer : Thermo Scientific al No. : B29792 bration Due Date : 05/06/2015
Liquid Junction Error	
Primary Standard Solution Used : Phosphate Temperature of Solution : $25.0 / 20.0$ pH value of diluted buffer : $6.89 / 6.92$ $\Delta pH = pH(S)$ - pH of diluted buffer = $0.03 / 0.04$ Liquid Junction Error ( $\Delta pH_j$ ) = $\Delta pH - \Delta pH_{\frac{1}{2}} = 0.02 / 0.02$	Ref No. of Primary Solution: $003/5.2/001/22 (25^{\circ}\text{C})$ $\Delta pH_{\frac{1}{2}} = \frac{003/5.2/001/23 (25^{\circ}\text{C})}{+0.01 / +0.01}$ $pH (S) = \frac{6.86 / 6.88}{0.03}$ (Observed Deviation)
Shift on Stirring	
pH of buffer solution (with stirring), pH <sub>s</sub> = $\frac{6.91}{}$ / Shift on stirring, $\Delta pH_s = pH_s - pH(S) - \Delta pH_j = \frac{0.03}{}$	6.91 0.00
<b>Noise</b> Noise, $\Delta pH_n$ = difference between max and min reading	: 0.01 / 0.01
Verification of ATC	
Ref. No. of reference thermometer used: Temperature record from the reference thermometer ( $T_R$ ). Temperature record from the ATC ( $T_{ATC}$ ): Temperature Difference, $ T_R - T_{ATC} $ Correction	ET/0521/019 / ET/0521/019 ) 25 / 20 ° C 24.9 / 19.9 ° C 0.1 / 0.1 ° C 0.1 / 0.1 ° C
Acceptance Criteria	
Performance Characteristic Liquid Junction Error ΔpHj Shift on Stirring ΔpHs Noise ΔpHn Verification of ATC Temperature Difference	Acceptable Range ≤0.05 ≤0.02 ≤0.02 ≤0.5°C
The pH meter complies * /-does not comply * with the sacceptable * / unacceptable * for use. Measurements are * Delete as appropriate	·
Calibrated by:	Checked by:



Performance	Check	of Turbio	lity Meter
-------------	-------	-----------	------------

Equipment Ref. No. : ET/0505/011 Manufacturer : HACH

Model No. : <u>2100Q</u> Serial No. : <u>12060 C 018534</u>

Ref. No. of Turbidity Standard used (4000NTU) 005/6.1/001/7

Theoretical Value of Turbidity Standard (NTU)	Measured Value (NTU)	Difference % *
20	20.2	1.00
100	103	3.00
800	787	-1.63

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

Acceptance Criteria

 $\hat{Y}^{(k)} = \{\hat{Y}^{(k)}_{k}, \dots, \hat{Y}^{(k)}_{k}\}$ 

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 Report of Dissolved Oxygen Meter

Equipment Ref. No.

ET/EW/008/006

Manufacturer

YSI

Model No.

Pro 2030

Serial No.

12A 100554

Date of Calibration

17/03/2015

Calibration Due Date

16/06/2015

### Temperature Verification

Ref. No. of Reference Thermometer:

ET/0521/008

Ref. No. of Water Bath:

\_\_\_

	Temperature (°C)				
Reference Thermometer reading	Measured	20.0	Corrected	19.4	
DO Meter reading	Measured	19.2	Difference	0.2	

### Standardization of sodium thiosulphate (Na 2S 2O 3) solution

Reagent No. of Na <sub>2</sub> S <sub>2</sub> O <sub>3</sub> titrant	CPE/012/4.5/001/11	Reagent No. of 0.025N K <sub>2</sub> Cr <sub>2</sub> O <sub>7</sub>	CPE/012/4.4/001/35	
J. C		Trial 1	Trial 2	
Initial Vol. of Na <sub>2</sub> S <sub>2</sub> O <sub>3</sub> (ml)		0.00	10.15	
Final Vol. of Na <sub>2</sub> S <sub>2</sub> O <sub>3</sub> (ml)		10.15	20.40	
Vol. of Na <sub>2</sub> S <sub>2</sub> O <sub>3</sub> used (ml)		10.15	10.25	
Normality of Na <sub>2</sub> S <sub>2</sub> O <sub>3</sub> solution (N)		0.02463	0.02439	
Average Normality (N) of Na <sub>2</sub> S <sub>2</sub> O <sub>3</sub> s	olution (N)	0.02451		
Acceptance criteria, Deviation		Less than ± 0.001N		

Calculation:

Normality of  $Na_2S_2O_3$ , N = 0.25 / ml  $Na_2S_2O_3$  used

### Lineality Checking

### Determination of dissolved oxygen content by Winkler Titration \*

Purging Time (min)		2		5		10	
Trial	1	2	1	2	1	2	
Initial Vol. of Na <sub>2</sub> S <sub>2</sub> O <sub>3</sub> (ml)	0.00	11.20	22.60	0.00	6.80	10.40	
Final Vol. of Na <sub>2</sub> S <sub>2</sub> O <sub>3</sub> (ml)	11.20	22.60	29.20	6.80	10.40	14.10	
Vol. (V) of $Na_2S_2O_3$ used (ml)	11,20	11.40	6.60	6.80	3.60	3.70	
Dissolved Oxygen (DO), mg/L	7.37	7.50	4.34	4.47	2.37	2.43	
Acceptance criteria, Deviation	Less that	n + 0.3mg/L	Less than	+ 0.3mg/L	Less than	+ 0.3mg/L	

Calculation:

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

Dunaina tima min	DO meter reading, mg/L			DO meter reading, mg/L Winkler Titration result *, mg/L		Winkler Titration result *, mg/L			Difference (%) of DO
Purging time, min	1	2	Average	1	2	Average	Content		
2	7.42	7.90	7.66	7.37	7.50	7.44	2.91		
5	4.38	4.10	4.24	4.34	4.47	4.41	3.93		
10	2.50	2.48	2.49	2.37	2.43	2.40	3.68		
Linea	r regression	coefficient		0.9954					

CEP/0,1,2/W.



## **Internal Calibration Report of Dissolved Oxygen Meter**

#### Zero Point Checking

DO meter reading, mg/L	0.00

### Salinity Checking

	T	1	
Reagent No. of NaCl (10ppt)	CPE/012/4.7/002/34	Reagent No. of NaCl (30ppt)	CPE/012/4.8/002/34

### Determination of dissolved oxygen content by Winkler Titration \*\*

Salinity (ppt)	10		30		
Trial	1	2	1	2	
Initial Vol. of Na <sub>2</sub> S <sub>2</sub> O <sub>3</sub> (ml)	0.00	11.90	23.50	34.00	
Final Vol. of Na <sub>2</sub> S <sub>2</sub> O <sub>3</sub> (ml)	11.90	23.50	34.00	44.30	
Vol. (V) of Na <sub>2</sub> S <sub>2</sub> O <sub>3</sub> used (ml)	11.90	11.60	10.50	10.30	
Dissolved Oxygen (DO), mg/L	7.83	7.63	6.91	6.78	
Acceptance criteria, Deviation	Less than + 0.3mg/L		nce criteria, Deviation Less than + 0.3mg/L Less than + 0.3mg/L		n + 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
Saminty (ppt)	1	2	Average	1	2	Average	Content
10	7.20	7.65	7.43	7.83	7.63	7.73	3.96
30	6.90	6.40	6.65	6.91	6.78	6.85	2.96

### Acceptance Criteria

- (1) Differenc 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  $\pm$  5%

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

\*Delete as appropriate

Calibrated by

W/

Approved by:

complement on the contract of the contract of

CEP/012/W



# Performance Check of Salinity Meter

Equipment Ref. No.

: ET/EW/008/006

Manufacturer

: YSI

Model No.

: Pro 2030

Serial No.

12A 100554

Date of Calibration

Inna de la

: 17/03/2015

Due Date

: 16/06/2015

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

S/001/5

Salinity Standard (ppt)	Measured Salinity (ppt)	Difference %
30.0	30.3	1.0

(\*) 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: