Location : AQM1
Calibrated by : P.F.Yeung
Date : 09/12/2013

Sampler

 Model
 :
 TE-5170

 Serial Number
 :
 S/N 1253

Calibration Orfice and Standard Calibration Relationship

Serial Number : 2323

 Service Date
 :
 26 Dec 2012

 Slope (m)
 :
 2.09107

 Intercept (b)
 :
 -0.02838

 Correlation Coefficient(r)
 :
 0.99996

Standard Condition

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

Calibration Condition

Pa (hpa) : 1014 Ta(K) : 293

| Resistance Plate | | dH [green liquid] | Z | X=Qstd | IC | Y |
|------------------|----------|-------------------|-------|-------------------|---------|-------------|
| | | (inch water) | | (cubic meter/min) | (chart) | (corrected) |
| 1 | 18 holes | 12.8 | 3.610 | 1.740 | 52 | 52.47 |
| 2 | 13 holes | 10.0 | 3.191 | 1.539 | 46 | 46.41 |
| 3 | 10 holes | 7.4 | 2.745 | 1.326 | 39 | 39.35 |
| 4 | 7 holes | 4.6 | 2.164 | 1.048 | 32 | 32.29 |
| 5 | 5 holes | 2.9 | 1.718 | 0.835 | 25 | 25.22 |

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

Sampler Calibration Relationship (Linear Regression)

Slope(m):29.770 Intercept(b): 0.512 Correlation Coefficient(r): 0.9991

Location : AQM1
Calibrated by : P.F.Yeung
Date : 10/02/2014

Sampler

 Model
 :
 TE-5170

 Serial Number
 :
 S/N 1253

Calibration Orfice and Standard Calibration Relationship

 Serial Number
 : 2454

 Service Date
 : 12 Mar 2013

 Slope (m)
 : 2.05818

 Intercept (b)
 : 0.01929

 Correlation Coefficient(r)
 : 0.99991

Standard Condition

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

Calibration Condition

Pa (hpa) : 1019 Ta(K) : 282

| Resistance Plate | | dH [green liquid] | Z | X=Qstd | IC | Y |
|------------------|----------|-------------------|-------|-------------------|---------|-------------|
| | | (inch water) | | (cubic meter/min) | (chart) | (corrected) |
| 1 | 18 holes | 12.5 | 3.645 | 1.762 | 54 | 55.67 |
| 2 | 13 holes | 10.1 | 3.277 | 1.583 | 48 | 49.49 |
| 3 | 10 holes | 7.5 | 2.824 | 1.362 | 42 | 43.30 |
| 4 | 7 holes | 4.7 | 2.235 | 1.077 | 33 | 34.02 |
| 5 | 5 holes | 3.0 | 1.786 | 0.858 | 26 | 26.81 |

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

Sampler Calibration Relationship (Linear Regression)

Slope(m):31.647 Intercept(b): 0.1797 Correlation Coefficient(r): 0.9997

Location : ASR 1
Calibrated by : P.F.Yeung
Date : 09/12/2013

Sampler

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

Calibration Orfice and Standard Calibration Relationship

Serial Number : 2323

 Service Date
 :
 26 Dec 2012

 Slope (m)
 :
 2.09107

 Intercept (b)
 :
 -0.02838

 Correlation Coefficient(r)
 :
 0.99996

Standard Condition

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

Calibration Condition

Pa (hpa) : 1014 Ta(K) : 293

| Resistance Plate | | dH [green liquid] | Z | X=Qstd | IC | Y |
|------------------|----------|-------------------|-------|-------------------|---------|-------------|
| | | (inch water) | | (cubic meter/min) | (chart) | (corrected) |
| 1 | 18 holes | 13.0 | 3.638 | 1.753 | 53 | 53.48 |
| 2 | 13 holes | 10.2 | 3.222 | 1.555 | 46 | 46.41 |
| 3 | 10 holes | 7.4 | 2.745 | 1.326 | 40 | 40.36 |
| 4 | 7 holes | 4.9 | 2.234 | 1.082 | 31 | 31.28 |
| 5 | 5 holes | 3.0 | 1.748 | 0.849 | 24 | 24.22 |

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): 32.296 Intercept(b): -3.257 Correlation Coefficient(r): 0.9990

Location : ASR 1
Calibrated by : P.F.Yeung
Date : 10/02/2014

Sampler

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

Calibration Orfice and Standard Calibration Relationship

Serial Number : 2454

 Service Date
 :
 12 Mar 2013

 Slope (m)
 :
 2.05818

 Intercept (b)
 :
 0.01929

 Correlation Coefficient(r)
 :
 0.99991

Standard Condition

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

Calibration Condition

Pa (hpa) : 1019 Ta(K) : 292

| Resistance Plate | | dH [green liquid] | Z | X=Qstd | IC | Y |
|------------------|----------|-------------------|-------|-------------------|---------|-------------|
| | | (inch water) | | (cubic meter/min) | (chart) | (corrected) |
| 1 | 18 holes | 13.0 | 3.717 | 1.797 | 53 | 54.64 |
| 2 | 13 holes | 10.2 | 3.293 | 1.590 | 46 | 47.43 |
| 3 | 10 holes | 7.4 | 2.805 | 1.353 | 40 | 41.24 |
| 4 | 7 holes | 4.9 | 2.282 | 1.099 | 31 | 31.96 |
| 5 | 5 holes | 3.0 | 1.786 | 0.858 | 24 | 24.74 |

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

Sampler Calibration Relationship (Linear Regression)

Slope(m):31.788 Intercept(b): -2.582 Correlation Coefficient(r): 0.9990

Location : ASR 5
Calibrated by : P.F.Yeung
Date : 09/12/2013

Sampler

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

Calibration Orfice and Standard Calibration Relationship

 Serial Number
 : 2323

 Service Date
 : 26 Dec 2012

 Slope (m)
 : 2.09107

 Intercept (b)
 : -0.02838

 Correlation Coefficient(r)
 : 0.99996

Standard Condition

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

Calibration Condition

Pa (hpa) : 1014 Ta(K) : 293

| Resistance Plate | | dH [green liquid] | Z | X=Qstd | IC | Y |
|------------------|----------|-------------------|-------|-------------------|---------|-------------|
| | | (inch water) | | (cubic meter/min) | (chart) | (corrected) |
| 1 | 18 holes | 12.4 | 3.553 | 1.713 | 53 | 53.48 |
| 2 | 13 holes | 10.0 | 3.190 | 1.539 | 48 | 48.43 |
| 3 | 10 holes | 7.4 | 2.745 | 1.326 | 42 | 42.38 |
| 4 | 7 holes | 4.6 | 2.164 | 1.048 | 34 | 34.31 |
| 5 | 5 holes | 2.8 | 1.688 | 0.821 | 26 | 26.23 |

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)

 $Slope(m): \underline{30.020} \quad Intercept(b): \underline{2.020} \quad Correlation \ Coefficient(r): \underline{0.9990}$

Location : ASR 5
Calibrated by : P.F.Yeung
Date : 10/02/2014

Sampler

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

Calibration Orfice and Standard Calibration Relationship

Serial Number : 2454

 Service Date
 :
 12 Mar 2013

 Slope (m)
 :
 2.05818

 Intercept (b)
 :
 0.01929

 Correlation Coefficient(r)
 :
 0.99991

Standard Condition

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

Calibration Condition

Pa (hpa) : 1019 Ta(K) : 282

| Resistance Plate | | dH [green liquid] | Z | X=Qstd | IC | Y |
|------------------|----------|-------------------|-------|-------------------|---------|-------------|
| | | (inch water) | | (cubic meter/min) | (chart) | (corrected) |
| 1 | 18 holes | 12.2 | 3.601 | 1.740 | 54 | 55.67 |
| 2 | 13 holes | 9.8 | 3.228 | 1.559 | 49 | 50.52 |
| 3 | 10 holes | 7.5 | 2.824 | 1.362 | 43 | 44.33 |
| 4 | 7 holes | 4.8 | 2.259 | 1.088 | 35 | 36.09 |
| 5 | 5 holes | 2.9 | 1.756 | 0.844 | 27 | 27.84 |

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

Sampler Calibration Relationship (Linear Regression)

Slope(m):31.009 Intercept(b): 1.999 Correlation Coefficient(r): 0.9996

Location : ASR 6
Calibrated by : P.F.Yeung
Date : 17/01/2014

Sampler

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

Calibration Orfice and Standard Calibration Relationship

Serial Number : 2454

 Service Date
 :
 12 Mar 2013

 Slope (m)
 :
 2.05818

 Intercept (b)
 :
 0.01929

 Correlation Coefficient(r)
 :
 0.99991

Standard Condition

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

Calibration Condition

Pa (hpa) : 1022 Ta(K) : 288

| Resistance Plate | | dH [green liquid] | Z | X=Qstd | IC | Y |
|------------------|----------|-------------------|-------|-------------------|---------|-------------|
| | | (inch water) | | (cubic meter/min) | (chart) | (corrected) |
| 1 | 18 holes | 12.4 | 3.599 | 1.739 | 56 | 57.22 |
| 2 | 13 holes | 9.7 | 3.182 | 1.537 | 49 | 50.06 |
| 3 | 10 holes | 7.1 | 2.722 | 1.313 | 43 | 43.93 |
| 4 | 7 holes | 4.5 | 2.167 | 1.044 | 34 | 34.74 |
| 5 | 5 holes | 2.9 | 1.740 | 0.836 | 27 | 27.59 |

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

Sampler Calibration Relationship (Linear Regression)

Slope(m): 32.751 Intercept(b): 0.726 Correlation Coefficient(r): 0.9993

High-Volume TSP Sampler 5-Point Calibration Record

Location : ASR 6
Calibrated by : P.F.Yeung
Date : 10/02/2014

Sampler

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

Calibration Orfice and Standard Calibration Relationship

Serial Number : 2454

 Service Date
 :
 12 Mar 2013

 Slope (m)
 :
 2.05818

 Intercept (b)
 :
 0.01929

 Correlation Coefficient(r)
 :
 0.99991

Standard Condition

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

Calibration Condition

Pa (hpa) : 1019 Ta(K) : 282

| Resistance Plate | | dH [green liquid] | Z | X=Qstd | IC | Y |
|------------------|----------|-------------------|-------|-------------------|---------|-------------|
| | | (inch water) | | (cubic meter/min) | (chart) | (corrected) |
| 1 | 18 holes | 12.6 | 3.660 | 1.769 | 57 | 58.77 |
| 2 | 13 holes | 9.9 | 3.244 | 1.567 | 50 | 51.55 |
| 3 | 10 holes | 7.2 | 2.767 | 1.335 | 42 | 43.30 |
| 4 | 7 holes | 4.7 | 2.235 | 1.077 | 34 | 35.05 |
| 5 | 5 holes | 2.8 | 1.725 | 0.829 | 25 | 25.78 |

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): 34.790 Intercept(b): -2.864 Correlation Coefficient(r): 0.9997

Location : ASR10A Calibrated by : P.F.Yeung Date : 09/12/2013

Sampler

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

Calibration Orfice and Standard Calibration Relationship

 Serial Number
 : 2323

 Service Date
 : 26 Dec 2012

 Slope (m)
 : 2.09107

 Intercept (b)
 : -0.02838

 Correlation Coefficient(r)
 : 0.99996

Standard Condition

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

Calibration Condition

Pa (hpa) : 1014 Ta(K) : 293

| Resi | stance Plate | dH [green liquid] | Z | X=Qstd | IC | Y |
|------|--------------|-------------------|-------|-------------------|---------|-------------|
| | | (inch water) | | (cubic meter/min) | (chart) | (corrected) |
| 1 | 18 holes | 12.8 | 3.610 | 1.740 | 62 | 62.56 |
| 2 | 13 holes | 10.6 | 3.285 | 1.585 | 55 | 55.49 |
| 3 | 10 holes | 7.8 | 2.818 | 1.361 | 45 | 45.40 |
| 4 | 7 holes | 5.0 | 2.256 | 1.093 | 34 | 34.31 |
| 5 | 5 holes | 3.1 | 1.777 | 0.863 | 22 | 22.20 |

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

Sampler Calibration Relationship (Linear Regression)

Slope(m): 45.377 Intercept(b): -16.281 Correlation Coefficient(r): 0.9991

Location : ASR10A Calibrated by : P.F.Yeung Date : 10/02/2014

Sampler

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

Calibration Orfice and Standard Calibration Relationship

Serial Number : 2454

 Service Date
 :
 12 Mar 2013

 Slope (m)
 :
 2.05818

 Intercept (b)
 :
 0.01929

 Correlation Coefficient(r)
 :
 0.99991

Standard Condition

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

Calibration Condition

Pa (hpa) : 1019 Ta(K) : 282

| Resistance Plate | | dH [green liquid] | Z | X=Qstd | IC | Y |
|------------------|----------|-------------------|-------|-------------------|---------|-------------|
| | | (inch water) | | (cubic meter/min) | (chart) | (corrected) |
| 1 | 18 holes | 12.6 | 3.660 | 1.769 | 57 | 58.77 |
| 2 | 13 holes | 10.5 | 3.341 | 1.614 | 52 | 53.61 |
| 3 | 10 holes | 7.6 | 2.842 | 1.372 | 45 | 46.40 |
| 4 | 7 holes | 4.8 | 2.259 | 1.088 | 36 | 37.12 |
| 5 | 5 holes | 3.0 | 1.786 | 0.858 | 28 | 28.87 |

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

Sampler Calibration Relationship (Linear Regression)

Slope(m): 32.526 Intercept(b): 1.364 Correlation Coefficient(r): 0.9995



Certification of Quality

This product has been tested in accordance with procedures established through Global Water Instrumentation's Quality Management System. This product meets or exceeds its manufacturing acceptance criteria.

ITEM DESCRIPTION:

Wind Direction

MODEL NAME/ NUMBER:

WE570

PART NUMBER:

ED0000

SENSOR RANGE:

0-360°

SENSOR OUTPUT:

4.01-20.03 mA

ACCURACY:

1% of full scale

POWER REQUIRED

10-36 VDC

SERIAL NUMBER:

1337005143

CABLE LENGTH:

25 ft

CERTIFICATES:

CE Compliant

Technician:

Wright, Jess

Date: 9/12/2013

Global Water Instrumentation warrants that its products are free from defects in material & workmanship under normal use & service for a period of one year from date of original shipment from factory. Repaired components are warranted for a period of 90 days from shipment. Contact us for complete warranty details.



In the U.S. call toll free at 1-800-876-1172 International 1-979-690-5560 Our Service Address Fax 1-979-690-0440 Email globalw@globalw.com College Station, TX 77845

Visit our online catalog at www.globalw.com 151 Graham Rd



Certification of Quality

This product has been tested in accordance with procedures established through Global Water Instrumentation's Quality Management System. This product meets or exceeds its manufacturing acceptance criteria.

ITEM DESCRIPTION:

Wind Speed Sensor

MODEL NAME/ NUMBER:

WE550

PART NUMBER:

EC0000

SENSOR RANGE:

0-110 MPH

SENSOR OUTPUT:

4.00-19.91 mA

ACCURACY:

.2 MPH over the range 11 to 55 MPH

POWER REQUIRED

10-36 VDC

SERIAL NUMBER:

1337005099

CABLE LENGTH:

25 ft

CERTIFICATES:

CE Compliant

Contact Global Water Water Leve Water Flow Water Samplers Water Qualit

Remote Monitoring

Technician:

Wright, Jess

Date: 9/10/2013

Global Water Instrumentation warrants that its products are free from defects in material & workmanship under normal use & service for a period of one year from date of original shipment from factory. Repaired components are warranted for a period of 90 days from shipment. Contact us for complete warranty details.



In the U.S. call toll free at 1-800-876-1172 International 1-979-690-5560 Our Service Address Fax 1-979-690-0440 Email globalw@globalw.com College Station, TX 77845

Visit our online catalog at www.globalw.com 151 Graham Rd



| Internal | Calibration & | Performan | ce Check | of pH Mete | er |
|---|--|-------------------------|--|--------------------------|--|
| Equipment Ref. No.: ET | /EW/007/003 | Manufacture | er : | HANNA | |
| | 8314 | Serial No. | Serial No | | |
| | 01. | | Due Date | 09/03/2014 | |
| | & 1010117118 | Odibidion | ouc bate . | a. 10/n) | 1214 |
| Liquid Junction Error | | | | | |
| Primary Standard Solution U | lsed : <u>Phosphate</u> | | Ref No. of I | Primary Solutio | n: <u>003/5.2/001/17</u> |
| Temperature of Solution: | 20.0 | | | ∆pH ½ | = <u>+0.08</u> |
| pH value of diluted buffer : | 6.80 | | | pH (S) | = 6.881 |
| ∆pH = pH(S) - pH of diluted | buffer = 0.081 | (Obs | erved Deviation | ٦) | · |
| Liquid Junction Error ($\triangle pH_j$) | $= \Delta pH - \Delta pH_{\frac{1}{2}} = 0.00$ | 01 | | | |
| Shift on Stirring | | | | | |
| nH of buffor colution (with at | irring) nU - | 6.87 | | | |
| • | (| | | | |
| Shift on stirring, $\Delta pH_s = pH_s$ - | pH(S) - ΔpH _j = | -0.012 | | | |
| Noise | | | | | |
| Noise, ΔpH_n = difference bet | ween max and min re | eading : | 0.00 | | |
| Verification of ATC | | | | 33 S | |
| Ref. No. of reference thermo | ometer used: | | ET/0521/008 | | |
| Temperature record from the | reference thermome | eter (T _R): | 20.0 | | °c |
| Temperature record from the | e ATC (T _{ATC}): | | 19.9 | 110 Warranti 110 Walance | °C |
| Temperature Difference, T | | | 0.1 | | °c |
| Acceptance Criteria | | | ** *********************************** | | |
| Performa | nce Characteristic | | Accepta | ble Range | \neg |
| Liquid Junction Error | ∆рНј | | · · · · · · · · · · · · · · · · · · · | 0.05 | |
| Shift on Stirring | ∆pHs | | ≤! | 0.02 | |
| Noise | ∆pHn | | | 0.02 | |
| Verifcation of ATC | Temperature | e Difference | ≤0 | 0.5°C | |
| The pH meter complies * / unacceptable * for use. Mea * Delete as appropriate | | • | | ts and is deer | ned acceptable * / |
| Doloto do appropriato | | | | | W. W |
| Calibrated by : | / . | | Checked by | . <u>~</u> | |
| Calibrated by . | 16 | | Ollecked by | . (| |

CPE/015/W



| | | | ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~ | | |
|--|--|---|---|----------------------|-------------------|
| Internal C | alibration & | Performanc | e Check | of pH Mete | P |
| Equipment Ref. No.: ET/E | EW/007/003 | Manufacturer | | : HANNA | |
| Model No. : HI 83 | 314 | Serial No. | | 674469 | |
| Date of Calibration : 10/0 | Date of Calibration : 10/02/2014 Calibration | | ue Date | : 09/03/2014 | |
| | | | | | |
| Liquid Junction Error | | | | | |
| Primary Standard Solution Use | ed : <u>Phosphate</u> | 9 | Ref No. of I | rimary Solution: | 003/5.2/001/17 |
| Temperature of Solution: | 20.0 | | | ΔpH _{1/2} = | +0.08 |
| pH value of diluted buffer : | 6.80 | | | pH (S) = | 6.881 |
| ∆pH = pH(S) - pH of diluted bu | uffer = 0.081 | (Obse | rved Deviation | <u>1)</u> | |
| Liquid Junction Error (ΔpH_j) = | ΔpH - ΔpH _½ = 0.0 | 001 | | | |
| Chift on Ctiving | | | | | |
| Shift on Stirring | | | | | |
| pH of buffer solution (with stirr | ing), pH _s = | 6.87 | | | |
| Shift on stirring, $\Delta pH_s = pH_s - pH_s$ | H(S) - ΔpH _j = | -0.012 | | | |
| Noise | | | | | |
| Noise, ∆pH _n = difference betw | een max and min r | reading : 0 | 0.00 | | |
| | | | | | |
| Verification of ATC | | | | | |
| Ref. No. of reference thermon | eter used: | E | ET/0521/008 | | _ |
| Temperature record from the r | eference thermom | eter (T _R): 2 | 20.0 | | °C |
| Temperature record from the A | ATC (T _{ATC}): | | 19.9 | | °C |
| Temperature Difference, T _R | - T _{ATC} | (|).1 | | °c |
| Acceptance Criteria | | | | | |
| | - Chanatariatia | | Aggarta | blo Dango | 1 |
| Liquid Junction Error | e Characteristic ∆pHj | | | ble Range 0.05 | |
| Shift on Stirring | ΔpHs | | | 0.02 | |
| Noise | ΔpHn | *************************************** | <u> </u> | 0.02 | |
| Verifcation of ATC | | re Difference | ≤C | 0.5°C | |
| The pH meter complies * / e unacceptable * for use. Meas * Delete as appropriate | loes not comply * urements are trace | with the specifie | d requiremen tandards. | ts and is deeme | ed acceptable * / |
| | | | · · · · · · · · · · · · · · · · · · · | | |
| Calibrated by : | 4 | | Checked by | : Sampleranoum | Proprieta |

CPE/015/W



Form E/CE/R/12 Issue 8 (1/2) [05/13]

Internal Calibration Report of Dissolved Oxygen Meter

Equipment Ref. No.

ET/EW/008/005

Manufacturer

YSI

Model No.

Pro 2030

Serial No.

12A 100353

Date of Calibration

29/01/2014

Calibration Due Date

28/04/2014

Temperature Verification

Ref. No. of Reference Thermometer:

DO Meter

ET/0521/008

Ref. No. of Water Bath:

| | Temperature (°C) | | | | | |
|-------------------------------|------------------|------|------------|------|--|--|
| Reference Thermometer reading | Measured | 20.2 | Corrected | 19.8 | | |
| DO Meter reading | Measured | 19.7 | Difference | 0.1 | | |

Standardization of sodium thiosulphate (Na $_2$ S $_2$ O $_3$) solution

| Reagent No. of Na ₂ S ₂ O ₃ titrant | CPE/012/4.5/001/8 | Reagent No. of 0.025N K ₂ Cr ₂ O ₇ | CPE/012/4.4/001/24 | |
|--|-------------------|---|--------------------|--|
| | | Trial I | Trial 2 | |
| Initial Vol. of Na ₂ S ₂ O ₃ (ml) | | 0.00 | 10.50 | |
| Final Vol. of Na ₂ S ₂ O ₃ (ml) | | 10.50 | 20.95 | |
| Vol. of Na ₂ S ₂ O ₃ used (ml) | | 10.50 | 10.45 | |
| Normality of Na ₂ S ₂ O ₃ solution (N) | | 0.02381 | 0.02392 | |
| Average Normality (N) of Na ₂ S ₂ O ₃ s | olution (N) | 0.02387 | | |
| 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 ₂ S ₂ O ₃ (ml) | 0.00 | 11.90 | 23.50 | 0.00 | 8.20 | 13.20 | |
| Final Vol. of Na ₂ S ₂ O ₃ (ml) | 11.90 | 23.50 | 31.90 | 8.20 | 13.20 | 17.90 | |
| Vol. (V) of Na ₂ S ₂ O ₃ used (ml) | 11.90 | 11.60 | 8.40 | 8.20 | 5.00 | 4.70 | |
| Dissolved Oxygen (DO), mg/L | 7.63 | 7.43 | 5.38 | 5.25 | 3.20 | 3.01 | |
| Acceptance criteria, Deviation | Less than + 0.3mg/L | | Less than | + 0.3mg/L | Less than | + 0.3mg/L | |

Calculation:

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

| | DO meter reading, mg/L | | Winkler Titration result *, mg/L | | | Difference (%) of DO | |
|-------------------|------------------------|-------------|----------------------------------|------|------|----------------------|---------|
| Purging time, min | 1 | 2 | Average | 1 | 2 | Average | Content |
| 2 | 7.65 | 7.41 | 7.53 | 7.63 | 7.43 | 7.53 | 0.00 |
| 5 | 5.38 | 5.21 | 5.30 | 5.38 | 5.25 | 5.32 | 0.38 |
| 10 | 3.22 | 3.09 | 3.16 | 3.20 | 3.01 | 3.11 | 1.59 |
| Linea | r regression | coefficient | | | | 0.9998 | |



Form E/CE/R/12 Issue 8 (2/2) [05/13]

Internal Calibration Report of Dissolved Oxygen Meter

Zero Point Checking

| DO meter reading, mg/L | 0.00 |
|------------------------|------|

Salinity Checking

| Reagent No. of NaCl (10ppt) | CPE/012/4.7/002/15 | Reagent No. of NaCl (30ppt) | CPE/012/4.8/002/15 |
|-----------------------------|--------------------|-----------------------------|--------------------|
| | | | |

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 | 12.30 | 24.40 | 35.80 |
| Final Vol. of Na ₂ S ₂ O ₃ (ml) | 12,30 | 24.40 | 35.80 | 47.00 |
| Vol. (V) of Na ₂ S ₂ O ₃ used (ml) | 12.30 | 12.10 | 11.40 | 11.20 |
| Dissolved Oxygen (DO), mg/L | 7.88 | 7.75 | 7.31 | 7.18 |
| Acceptance criteria, Deviation | Less than + 0.3mg/L | | Less that | 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) | I | 2 | Average | 1 | 2 | Average | Content |
| 10 | 7.88 | 7.65 | 7.77 | 7.88 | 7.75 | 7.82 | 0.64 |
| 30 | 7.23 | 7.14 | 7.19 | 7.31 | 7.18 | 7.25 | 0.83 |

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

Approved by:

9

CEP/012/W



Performance Check of Salinity Meter

Equipment Ref. No. : ET/EW/008/005

Manufacturer

: YSI

Model No.

: Pro 2030

Serial No.

: 12A 100353

Date of Calibration

: 29/01/2014

Due Date

: 28/04/2014

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

S/001/5

| Salinity Standard (ppt) | Measured Salinity (ppt) | Difference % |
|----------------------------|----------------------------|--------------|
| 30.0 | 30.9 | 3.00 |

Acceptance Criteria

Difference: <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/0505/010 Manufacturer : HACH

Serial No. : 11110 C 014260 Model No. : 2100Q

: 06/04/2014 Date of Calibration : 07/01/2014 Due Date

| Theoretical Value of Turbidity Standard (NTU) | Measured Value (NTU) | Difference % * |
|--|----------------------|----------------|
| 20 | 19.2 | -4.08 |
| 100 | 104 | 3.92 |
| 800 | 793 | -0.88 |

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

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.

Checked by: Prepared by: