

## Appendix F Water Quality Equipment Calibration Certificate



## REPORT OF EQUIPMENT PERFORMANCE CHECK/CALIBRATION

CONTACT:	MR NELSON TSUI	WORK ORDER:	HK1917914
CLIENT:	ACUITY SUSTAINABILITY CONSULTING LIMITED		
ADDRESS:	1908, iPLACE, NOS. 301-305 CASTLE PEAK ROAD, KWAI CHUNG, NEW TERRITORIES, HONG KONG	SUB-BATCH:	0
		LABORATORY:	HONG KONG
		DATE RECEIVED:	30-Apr-2019
		DATE OF ISSUE:	09-May-2019

### COMMENTS

The performance of the equipment stated in this report is checked with independent reference material and results compared against a calibrated secondary source.

**The "Tolerance Limit" quoted is the acceptance criteria applicable for similar equipment used by the ALS Hong Kong laboratory or quoted from relevant international standards.**

**The "Next Calibration Date" is recommended according to best practice principle as practised by the ALS Hong Kong laboratory or quoted from relevant international standards.**

Scope of Test:	Dissolved Oxygen, pH Value, Turbidity, Salinity, Redox Potential and Temperature
Equipment Type:	Multifunctional Meter
Brand Name:	HORIBA
Model No.:	U-5000 Multiparameter Water Quality Meter
Serial No.:	--
Equipment No.:	BGYP9CKD
Date of Calibration:	09-May-2019

### NOTES

This is the Final Report and supersedes any preliminary report with this batch number.

Results apply to sample(s) as submitted. All pages of this report have been checked and approved for release.

Mr Chan Siu Ming, Vico  
Manager - Inorganic

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# REPORT OF EQUIPMENT PERFORMANCE CHECK/CALIBRATION



WORK ORDER: HK1917914  
 SUB-BATCH: 0  
 DATE OF ISSUE: 09-May-2019  
 CLIENT: ACUITY SUSTAINABILITY CONSULTING LIMITED

Equipment Type: Multifunctional Meter  
 Brand Name: HORIBA  
 Model No.: U-5000 Multiparameter Water Quality Meter  
 Serial No.: --  
 Equipment No.: BGY99CKD  
 Date of Calibration: 09-May-2019                      Date of Next Calibration: 09-Aug-2019

PARAMETERS:  
 Dissolved Oxygen    Method Ref: APHA (21st edition), 4500-O: G

Expected Reading (mg/L)	Displayed Reading (mg/L)	Tolerance (mg/L)
8.10	8.11	+0.01
5.57	5.42	-0.15
3.15	3.06	-0.09
Tolerance Limit (mg/L)		±0.20

pH Value                      Method Ref: APHA (21st edition), 4500H:B

Expected Reading (pH unit)	Displayed Reading (pH unit)	Tolerance (pH unit)
4.0	3.94	-0.06
7.0	7.06	+0.06
10.0	9.87	-0.13
Tolerance Limit (pH unit)		±0.20

Remark: "Displayed Reading" presents the figures shown on item under calibration / checking regardless of equipment precision or significant figures.

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Mr Chan Siu Ming, Vico  
 Manager - Inorganic

# REPORT OF EQUIPMENT PERFORMANCE CHECK/CALIBRATION



WORK ORDER: HK1917914  
 SUB-BATCH: 0  
 DATE OF ISSUE: 09-May-2019  
 CLIENT: ACUITY SUSTAINABILITY CONSULTING LIMITED

Equipment Type: Multifunctional Meter  
 Brand Name: HORIBA  
 Model No.: U-5000 Multiparameter Water Quality Meter  
 Serial No.: --  
 Equipment No.: BGYP9CKD  
 Date of Calibration: 09-May-2019                      Date of Next Calibration: 09-Aug-2019

**PARAMETERS:**

Turbidity                      Method Ref: APHA (21st edition), 2130B

Expected Reading (NTU)	Displayed Reading (NTU)	Tolerance (%)
0	0.33	--
4	4.21	+5.3
40	42.3	+5.7
80	81.3	+1.6
400	402	+0.5
800	845	+5.6
	Tolerance Limit (%)	±10.0

Salinity                      Method Ref: APHA (21st edition), 2520B

Expected Reading (ppt)	Displayed Reading (ppt)	Tolerance (%)
0	0.0	--
10	9.8	-2.0
20	19.7	-1.5
30	29.9	-0.3
	Tolerance Limit (%)	±10.0

Remark: "Displayed Reading" presents the figures shown on item under calibration / checking regardless of equipment precision or significant figures.

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Manager - Inorganic

# REPORT OF EQUIPMENT PERFORMANCE CHECK/CALIBRATION



WORK ORDER: HK1917914  
SUB-BATCH: 0  
DATE OF ISSUE: 09-May-2019  
CLIENT: ACUITY SUSTAINABILITY CONSULTING LIMITED

Equipment Type: Multifunctional Meter  
Brand Name: HORIBA  
Model No.: U-5000 Multiparameter Water Quality Meter  
Serial No.: --  
Equipment No.: BGY99CKD  
Date of Calibration: 09-May-2019      Date of Next Calibration: 09-Aug-2019

PARAMETERS:  
Temperature      Method Ref: Section 6 of International Accreditation New Zealand Technical Guide No. 3 Second edition March 2008: Working Thermometer Calibration Procedure.

Expected Reading (°C)	Displayed Reading (°C)	Tolerance (°C)
9.5	10.11	+0.6
19.0	19.45	+0.4
38.5	39.05	+0.5
	Tolerance Limit (°C)	±2.0

Remark: "Displayed Reading" presents the figures shown on item under calibration / checking regardless of equipment precision or significant figures.

Mr Chan Siu Ming, Vico  
Manager - Inorganic

# REPORT OF EQUIPMENT PERFORMANCE CHECK/CALIBRATION



WORK ORDER: HK1917914  
SUB-BATCH: 0  
DATE OF ISSUE: 09-May-2019  
CLIENT: ACUITY SUSTAINABILITY CONSULTING LIMITED

Equipment Type: Multifunctional Meter  
Brand Name: HORIBA  
Model No.: U-5000 Multiparameter Water Quality Meter  
Serial No.: --  
Equipment No.: BGY99CKD  
Date of Calibration: 09-May-2019 Date of Next Calibration: 09-Aug-2019

PARAMETERS:  
Redox Potential Method Ref: APHA (21st edition), 2580B  
Method Ref: Orion Research Instruction Manual and the Laboratory Manual  
the Environmental of Water, Wastewater and Soil (2nd edition), Rump & Krist (1992)

Expected Reading (mV)	Displayed Reading (mV)	Difference of A and B (mV)
Solution A (-234mV)	68	
Solution B (-300mV)	115	+47.0
	Tolerance Limit (mV)	>66

Remark: "Displayed Reading" presents the figures shown on item under calibration / checking regardless of equipment precision or significant figures.

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## REPORT OF EQUIPMENT PERFORMANCE CHECK/CALIBRATION

CONTACT:	MR NELSON TSUI	WORK ORDER:	HK1913288
CLIENT:	ACUITY SUSTAINABILITY CONSULTING LIMITED		
ADDRESS:	1908, IPLACE, NOS. 301-305 CASTLE PEAK ROAD, Kwai Chung, New Territories, HONG KONG	SUB-BATCH:	0
		LABORATORY:	HONG KONG
		DATE RECEIVED:	29-Mar-2019
		DATE OF ISSUE:	24-Apr-2019

### COMMENTS

The performance of the equipment stated in this report is checked with independent reference material and results compared against a calibrated secondary source.

**The "Tolerance Limit" quoted is the acceptance criteria applicable for similar equipment used by the ALS Hong Kong laboratory or quoted from relevant international standards.**

Scope of Test:	Dissolved Oxygen, pH Value, Turbidity, Salinity and Temperature
Equipment Type:	Multifunctional Meter
Brand Name:	YSI
Model No.:	Professional DSS
Serial No.:	--
Equipment No.:	15M101091
Date of Calibration:	29-Mar-2019, 11-Apr-2019 and 18-Apr-2019

### NOTES

This is the Final Report and supersedes any preliminary report with this batch number.

Results apply to sample(s) as submitted. All pages of this report have been checked and approved for release.

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Manager - Inorganic

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# REPORT OF EQUIPMENT PERFORMANCE CHECK/CALIBRATION



WORK ORDER: HK1913288  
 SUB-BATCH: 0  
 DATE OF ISSUE: 24-Apr-2019  
 CLIENT: ACUITY SUSTAINABILITY CONSULTING LIMITED

Equipment Type: Multifunctional Meter  
 Brand Name: YSI  
 Model No.: Professional DSS  
 Serial No.: --  
 Equipment No.: 15M101091  
 Date of Calibration: 29-Mar-2019                      Date of Next Calibration: 29-Jun-2019

PARAMETERS:  
 Dissolved Oxygen    Method Ref: APHA (21st edition), 4500-O: G

Expected Reading (mg/L)	Displayed Reading (mg/L)	Tolerance (mg/L)
2.85	2.74	-0.11
5.99	5.99	+0.00
8.54	8.50	-0.04
	Tolerance Limit (mg/L)	±0.20

Salinity                      Method Ref: APHA (21st edition), 2520B

Expected Reading (ppt)	Displayed Reading (ppt)	Tolerance (%)
0	0.00	--
10	9.94	-0.6
20	19.84	-0.8
30	29.70	-1.0
	Tolerance Limit (%)	±10.0

Temperature                      Method Ref: Section 6 of International Accreditation New Zealand Technical Guide No. 3 Second edition March 2008: Working Thermometer Calibration Procedure.

Expected Reading (°C)	Displayed Reading (°C)	Tolerance (°C)
9.0	10.4	+1.4
23.0	22.5	-0.5
40.0	38.0	-2.0
	Tolerance Limit (°C)	±2.0

Remark: "Displayed Reading" presents the figures shown on item under calibration / checking regardless of equipment precision or significant figures.

Mr Chan Siu Ming, Vico  
 Manager - Inorganic



# REPORT OF EQUIPMENT CALIBRATION



WORK ORDER: HK1913288  
SUB-BATCH: 0  
DATE OF ISSUE: 24-Apr-2019  
CLIENT: ACUITY SUSTAINABILITY CONSULTING LIMITED

Equipment Type: Multifunctional Meter  
Brand Name: YSI  
Model No.: Professional DSS  
Serial No.: --  
Equipment No.: 15M101091  
Date of Calibration: 11-Apr-2019 Date of Next Calibration: 29-Jun-2019

PARAMETERS:  
Turbidity Method Ref: APHA (21st edition), 2130B

Expected Reading (NTU)	Displayed Reading (NTU)	Tolerance (%)
0	0.03	--
4	3.78	-5.5
40	39.77	-0.6
80	79.08	-1.2
400	412.13	+3.0
800	842.98	+5.4
	Tolerance Limit (%)	±10.0

Remark: "Displayed Reading" presents the figures shown on item under calibration / checking regardless of equipment precision or significant figures.

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Manager - Inorganic

# REPORT OF EQUIPMENT PERFORMANCE CHECK/CALIBRATION



WORK ORDER: HK1913288  
 SUB-BATCH: 0  
 DATE OF ISSUE: 24-Apr-2019  
 CLIENT: ACUITY SUSTAINABILITY CONSULTING LIMITED

Equipment Type: Multifunctional Meter  
 Brand Name: YSI  
 Model No.: Professional DSS  
 Serial No.: --  
 Equipment No.: 15M101091  
 Date of Calibration: 18 April, 2019                      Date of Next Calibration: 29-Jun-2019

**PARAMETERS:**

pH Value                      Method Ref: APHA (21st edition), 4500H:B

Expected Reading (pH unit)	Displayed Reading (pH unit)	Tolerance (pH unit)
4.0	3.98	-0.02
7.0	7.03	+0.03
10.0	9.99	-0.01
	Tolerance Limit (pH unit)	±0.20

Remark: "Displayed Reading" presents the figures shown on item under calibration / checking regardless of equipment precision or significant figures.

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Mr Chan Siu Ming, Vico  
Manager - Inorganic

# REPORT OF EQUIPMENT PERFORMANCE CHECK



WORK ORDER: HK1913288  
SUB-BATCH: 0  
DATE OF ISSUE: 24-Apr-2019  
CLIENT: ACUITY SUSTAINABILITY CONSULTING LIMITED

Equipment Type: Multifunctional Meter  
Brand Name: YSI  
Model No.: Professional DSS  
Serial No.: --  
Equipment No.: 15M101091  
Date of Calibration: 29-Mar-2019

## PARAMETERS:

Turbidity Method Ref: APHA (21st edition), 2130B

Expected Reading (NTU)	Displayed Reading (NTU)	Tolerance (%)
0	-0.54	--
4	4.24	+6.0
40	43.30	+8.2
80	87.60	+9.5
400	372.26	-6.9
800	562.73	-29.7
	Tolerance Limit (%)	±10.0

Remark: "Displayed Reading" presents the figures shown on item under calibration / checking regardless of equipment precision or significant figures.

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Manager - Inorganic