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Tel : (852) 2873 6860 Fax: (852) 2555 7533



CERTIFICATE OF CALIBRATION

Certificate No.:

14CA1213 01

Page

of

Item tested

Description:

Sound Level Meter (Type 1)

Microphone

Manufacturer:

B&K 2236

B&K

Type/Model No.: Serial/Equipment No.: 2100736

4188 2288941

Adaptors used:

Item submitted by

Customer Name:

Lam Geotechnics Limited

Address of Customer:

Request No.:

13-Dec-2014

Date of receipt:

Date of test:

13-Dec-2014

Reference equipment used in the calibration

Model:

Serial No.

Expiry Date:

Traceable to:

Multi function sound calibrator

B&K 4226

2288444

20-Jun-2015

CIGISMEC

Signal generator Signal generator

DS 360 DS 360

33873 61227

09-Apr-2015 09-Apr-2015

CEPREI CEPREI

Ambient conditions

Temperature:

21 ± 1 °C

Relative humidity: Air pressure:

60 ± 5 % 1010 ± 5 hPa

Test specifications

The Sound Level Meter has been calibrated in accordance with the requirements as specified in BS 7580; Part 1: 1997 and the lab calibration procedure SMTP004-CA-152.

2. The electrical tests were performed using an electrical signal substituted for the microphone which was removed and replaced by an equivalent capacitance within a tolerance of ±20%.

The acoustic calibration was performed using an B&K 4226 sound calibrator and corrections was applied for the difference 3, between the free-field and pressure responsess of the Sound Level Meter.

Test results

This is to certify that the Sound Level Meter conforms to BS 7580: Part 1: 1997 for the conditions under which the test was performed.

Details of the performed measurements are presented on page 2 of this certificate.

Actual Measurement data are documented on worksheets.

Approved Signatory:

Date:

15-Dec-2014

Company Chop:

Huang Jian Min/∮eng Jun Qi

Comments: The results reported in his certificate refer to the condition of the instrument on the date of calibration and carry no implication regarding the long-term stability of the instrument.

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Form No CARP152-1/Issue 1/Rev C/01/02/2007



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CERTIFICATE OF CALIBRATION

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1, Electrical Tests

The electrical tests were performed using an equivalent capacitance substituted for the microphone. The results are given in below with test status and the estimated uncertainties. The "Pass" means the result of the test is inside the tolerances stated in the test specifications. The "-" means the result of test is outside these tolerances.

Test:	Subtest:	Status:	Expanded Uncertanity (dB)	Coverage Factor
Self-generated noise	A	Pass	0.3	
	С	Pass	1.0	2.1
	Lin	Pass	2.0	2.2
Linearity range for Leq	At reference range, Step 5 dB at 4 kHz	Pass	0.3	
	Reference SPL on all other ranges	Pass	0.3	
	2 dB below upper limit of each range	Pass	0.3	
	2 dB above lower limit of each range	Pass	0.3	
Linearity range for SPL	At reference range, Step 5 dB at 4 kHz	Pass	0.3	
Frequency weightings	Α	Pass	0.3	
	С	Pass	0.3	
	Lin	Pass	0.3	
Time weightings	Single Burst Fast	Pass	0.3	
	Single Burst Slow	Pass	0.3	
Peak response	Single 100µs rectangular pulse	Pass	0.3	
R.M.S. accuracy	Crest factor of 3	Pass	0.3	
Time weighting I	Single burst 5 ms at 2000 Hz	Pass	0.3	
	Repeated at frequency of 100 Hz	Pass	0.3	
Time averaging	1 ms burst duty factor 1/103 at 4kHz	Pass	0.3	
	1 ms burst duty factor 1/104 at 4kHz	Pass	0.3	
Pulse range	Single burst 10 ms at 4 kHz	Pass	0.4	
Sound exposure level	Single burst 10 ms at 4 kHz	Pass	0.4	
Overload indication	SPL	Pass	0.3	
	Leq	Pass	0.4	

2, Acoustic tests

The complete sound level meter was calibrated on the reference range using a B&K 4226 acoustic calibrator with 1000Hz and SPL 94 dB. The sensitivity of the sound level meter was adjusted. The test result at 125 Hz and 8000 Hz are given in below with test status and the estimated uncertainties.

Test:	Subtest	Status	Expanded Uncertanity (dB)	Coverage Factor
Acoustic response	Weighting A at 125 Hz	Pass	0.3	
	Weighting A at 8000 Hz	Pass	0.5	
			0.0	

3, Response to associated sound calibrator

N/A

The expanded uncertainties have been calculated in accordance with the ISO Publication "Guide to the expression of uncertainty in measurement", and gives an interval estimated to have a level of confidence of 95%. A coverage factor of 2 is assumed unless explicitly stated.

Calibrated by:

Date:

Fung Chi Yip 13-Dec-2014 End

Checked by:

Date:

Lam Tze Wai 15-Dec-2014

The standard(s) and equipment used in the calibration are traceable to national or international recognised standards and are calibrated on a schedule to maintain the required accuracy level.

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Form No.CARP152-2/Issue 1/Rev.C/01/02/2007



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Tel: (852) 2873 6860 Fax: (852) 2555 7533



CERTIFICATE OF CALIBRATION

Certificate No.:

14CA0529 01-02

Page:

of

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to:

Item tested

Description:

Acoustical Calibrator (Class 1)

Manufacturer: Type/Model No .: Rion Co., Ltd. NC-73

Serial/Equipment No.:

10465798

Adaptors used:

Item submitted by

Curstomer:

Lam Geotechnics Limited

Address of Customer:

Request No : Date of receipt:

29-May-2014

Date of test:

30-May-2014

Reference equipment used in the calibration

Description:	Model:	Serial No.	Expiry Date:	Traceable
Lab standard microphone	B&K 4180	2412857	13-May-2015	SCL
Preamplifier	B&K 2673	2239857	10-Apr-2015	CEPREI
Measuring amplifier	B&K 2610	2346941	08-Apr-2015	CEPREI
Signal generator	DS 360	61227	09-Apr-2015	CEPREI
Digital multi-meter	34401A	US36087050	17-Dec-2014	CEPREI
Audio analyzer	8903B	GB41300350	07-Apr-2015	CEPREI
Universal counter	53132A	MY40003662	11-Apr-2015	CEPREI

Ambient conditions

Temperature:

22 ± 1 °C

Relative humidity:

60 ± 10 %

Air pressure: 1000 ± 10 hPa

Test specifications

- 1, The Sound Calibrator has been calibrated in accordance with the requirements as specified in IEC 60942 1997 Annex B and the lab calibration procedure SMTP004-CA-156.
- 2. The calibrator was tested with its axis vertical facing downwards at the specific frequency using insert voltage technique.
- The results are rounded to the nearest 0.01 dB and 0.1 Hz and have not been corrected for variations from a reference 3, pressure of 1013.25 hectoPascals as the maker's information indicates that the instrument is insensitive to pressure changes.

Test results

Details of the performed measurements are presented on page 2 of this certificate.

Huang Jian Min/Feng Jun Qi

Approved Signatory:

Date:

30-May-2014

Company Chop:

Comments: The results reported in his certificate refer to the condition of the instrument on the date of calibration and carry no implication regarding the long-term stability of the instrument.

Soils & Materials Engineering Co., Ltd.

Form No.CARP156-1/Issue 1/Rev D/01/03/2007



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CERTIFICATE OF CALIBRATION

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Certificate No.:

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1, Measured Sound Pressure Level

The output Sound Pressure Level in the calibrator head was measured at the setting and frequency shown using a calibrated laboratory standard microphone and insert voltage technique. The results are given in below with the estimated uncertainties.

			(Output level in dB re 20 µPa
Frequency Shown Hz	Output Sound Pressure Level Setting dB	Measured Output Sound Pressure Level dB	Estimated Expanded Uncertainty dB
1000	94.00	94.57	0.10

2, Sound Pressure Level Stability - Short Term Fluctuations

The Short Term Fluctuations was determined by measuring the maximum and minimum of the fast weighted DC output of the B&K 2610 measuring amplifier over a 20 second time interval as required in the standard. The Short Term Fluctuation was found to be:

At 1000 Hz

STF = 0.001 dB

Estimated expanded uncertainty

0.005 dB

3, Actual Output Frequency

The determination of actual output frequency was made using a B&K 4180 microphone together with a B&K 2673 preamplifier connected to a B&K 2610 measuring amplifier. The AC output of the B&K 2610 was taken to an universal counter which was used to determine the frequency averaged over 20 second of operation as required by the standard. The actual output frequency at 1 KHz was:

At 1000 Hz

Actual Frequency = 965.6 Hz

Estimated expanded uncertainty

0.1 Hz

Coverage factor k = 2.2

4, Total Noise and Distortion

For the Total Noise and Distortion measurement, the unfiltered AC output of the B&K 2610 measuring amplifier was connected to an Agilent Type 8903 B distortion analyser. The TND result at 1 KHz was:

At 1000 Hz

TND = 0.9 %

Estimated expanded uncertainty

0.7 %

The expanded uncertainties have been calculated in accordance with the ISO Publication "Guide to the expression of uncertainty in measurement", and gives an interval estimated to have a level of confidence of 95%. A coverage factor of 2 is assumed unless explicitly stated.

Calibrated by:

End

Date:

Fung Chi Yip 30-May-2014 Checked by:

Date:

Lam Tze Wai 30-May-2014

The standard(s) and equipment used in the calibration are traceable to national or international recognised standards and are calibrated on a schedule to maintain the required accuracy level.

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Form No CARP156-2/Issue 1/Rev.C/01/05/2005



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

					METER	ORFICE
PLATE OR Run #	VOLUME START (m3)	VOLUME STOP (m3)	DIFF VOLUME (m3)	DIFF TIME (min)	DIFF Hg (mm)	DIFF H2O (in.)
1	NA	NA	1.00	1.3870	3.2	2.00
2	NA	NA	1.00	0.9830	6.4	4.0
3	NA	NA	1.00	0.8760	7.9	5.0
4	NA	NA	1.00	0.8340	8.8	5.5
5	NA	NA	1.00	0.6860	12.7	8.0

DATA TABULATION

Vstd	(x axis) Qstd	(y axis)		Va	(x axis) Qa	(y axis)
0.9817 0.9775 0.9754 0.9743 0.9692	0.7078 0.9944 1.1135 1.1683 1.4128	1.4042 1.9859 2.2203 2.3286 2.8084		0.9957 0.9915 0.9894 0.9882 0.9830	0.7179 1.0086 1.1294 1.1849 1.4330	0.8919 1.2613 1.4101 1.4790 1.7837
Qstd slo	t (b) =	1.99175 -0.00041 0.99991		Qa slop intercep coeffici	t (b) =	1.24720 -0.00026 0.99991
y axis =	SQRT [H2O (F	a/760) (298/7	[a)]	y axis =	SQRT[H2O(T	Ca/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 = $1/m\{ [SQRT H2O(Ta/Pa)] - b\}$



Location :		CMA1b				Calbratio	on Date	:	18-Dec-14
Equipment no.		EL452				Calbratio	on Due Date	:	18-Feb-15
CALIBRATION OF CON	ITINUOUS	FLOW RE	CORDER						
				Ambient C	Condition				
Temperature, T _a		287		Kelvin	Pressure, P	a	1	026	mmHg
	,		Orifice Tr	ansfer Sta	ındard Inforr	nation			
Equipment No.		EL086		Slope, m _c	1.991	75	Intercept, bc		-0.00041
Last Calibration Date		14-Jul-14	1		(Hx	T _a)	1/2		
Next Calibration Date		14-Jul-1	5		. =	α,			
				Calibratio	n of TSP				
Calibration	Mar	nometer Re	eading	G	l _{std}	Continu	uous Flow		IC
Point	H (i	inches of v	water)	(m³ / min.)		Reco	rder, W	(W(P _a	/1013.3x298/T _a) ^{1/2} /35.31)
	(up)	(down)	(difference)			(CFM)			Y-axis
1	6.2	6.2	12.4	1.8130		65			66.6477
2	4.5	4.5	9.0	1.5	5446	55			56.3942
3	3.9	3.9	7.8	1.4	4380		50	51.2675	
4	2.5	2.5	5.0	1.	1513		42		43.0647
5	1.4	1.4	2.8	0.0	3616		31		31.7858
By Linear Regression of	Y on X								
	Slope, m	=	36.0	094	Into	ercept, b =	0.	7978	
Correlation Co	oefficient*	=	0.99	981					
Calibration	Accepted	=	Yes/	Ve**					
* if Correlation Coefficier	ot < 0.000	chook and	rocalibratio	n again					
ii Correlation Coefficier	n < 0.990,	CHECK and	recalibration	ii agaiii.					
** Delete as appropriate.	-								
Remarks :									
Calibrated by	Н	lenry Lau				Checked	l by	:	Derek Lo
Date :	18	8-Dec-14				Date		:	18-Dec-14



Location :		CMA1b				Calbratio	on Date	:	12-Feb-15
Equipment no.		EL452				Calbratio	on Due Date	:	12-Apr-15
CALIBRATION OF CON	ITINUOUS	FLOW RE	CORDER						
				Ambient C	ondition				
Temperature, T _a		290		Kelvin	Pressure, P	a	1	018	mmHg
			Orifice Tr	ansfer Sta	ndard Inforr	mation			
Equipment No.		EL086		Slope, m _c	1.991	75	Intercept, bc	Т	-0.00041
Last Calibration Date		14-Jul-14	1		(H x	$T_a)^{1}$	1/2		
Next Calibration Date		14-Jul-1	5		α,				
				Calibratio	n of TSP				
Calibration	Man	nometer Re	eading		std	Continu	ious Flow		IC
Point		inches of	_		/ min.)		rder, W	(W(P ₂ /1	013.3x298/T _a) ^{1/2} /35.31)
	(up)	(down)	(difference)				CFM)	((a	Y-axis
1	6.6	6.6	13.2	1.8536		65			66.0431
2	5.3	5.3	10.6	1.0	6611		58		58.9308
3	4.0	4.0	8.0	1.4	1431		50	50.8024	
4	2.6	2.6	5.2	1.	1635		40		40.6419
5	1.5	1.5	3.0	0.0	3838		30		30.4814
By Linear Regression of	Y on X		<u>I</u>						
	Slope, m	=	36.6	703	Inte	ercept, b =	-1.	9950	
Correlation Co	oefficient*	=	1.00	000					
Calibration	Accepted	=	Yes/f	No**					
* if Correlation Coefficier	ot - 0 000	ahaak ana	rocalibratio	o ogoin					
ii Correlation Coefficier	11 < 0.990,	check and	recalibration	ı ayaırı.					
** Delete as appropriate.									
Remarks :									
Calibrated by	L	.uLu Mar				Checked	l by	:	Derek Lo
Date :	1:	2-Feb-15				Date		:	12-Feb-15



				_			_	-	
Location :		CMA2a				Calbratio	on Date	:	18-Dec-14
Equipment no.		EL449				Calbratio	on Due Date	:	18-Feb-15
CALIBRATION OF CON	TINUOUS	S FLOW RI	<u>ECORDER</u>						
				Ambient Con	dition				
Temperature, T _a		287		Kelvin Pr	essure, P	a	1	026	mmHg
			Orifice Tr	ansfer Stand	ard Inforr	nation			
Equipment No.		EL086		Slope, mc	1.9917		Intercept, bc	Т	-0.00041
Last Calibration Date		14-Jul-1		• ′	$(T_a)^{1/2}$				
Next Calibration Date		14-Jul-1	5		=		$Q_{std} + b_c$	· a/	
				Calibration of	4 TOD				
Calibration	Mor	nameter D			1	Continu	ous Flow		IC
Point		nometer R		Q st				//N//D /4046	3.3x298/T _a) ^{1/2} /35.31)
Point		inches of	-	(m ³ / m			rder, W		Y-axis
1	(up) 6.1	(down) 6.1	(difference)				62		63.5717
2		4.9						56.3942	
3	4.9 3.7	3.7	9.8 7.4	1.611			55 49	50.2421	
4		2.3	4.6	1.400			40		
5	2.3 1.2	1.2	2.4	0.797			32		41.0140 32.8112
By Linear Regression of		1.2	2.4	0.797	7	,	32		JZ.011Z
by Ellieal Regression of	Slope, m	=	30.4	803	Inte	ercept, b =	7:	8731	
Correlation Co	·	=	0.99			огоорт, в —			
Calibration			Yes/P						
Gaill and in	, 1000p100								
* if Correlation Coefficier	nt < 0.990,	, check and	d recalibration	n again.					
** Delete as appropriate.									
Domarka :									
Remarks :									
		lenny Lau				Checked	l by		Derek Lo
Calibrated by		lenry Lau 8-Dec-14				Date	Jy	·	18-Dec-14
Date	I	0-D60-14				Date		•	10-060-14



				_		-	-	-	
Location :		CMA2a				Calbratio	on Date	:	12-Feb-15
Equipment no.		EL449				Calbratio	on Due Date	:	12-Apr-15
CALIBRATION OF CON	ITINUOUS	S FLOW RI	ECORDER						
				Ambient Cor	dition				
Temperature, T _a		291		Kelvin Pr	essure, P _a			1015	mmHg
			Orifica Tr	ansfer Stand	ard Inform	ation			
Equipment No.		EL086		Slope, mc	1.9917		Intercept, bc	Т	-0.00041
Last Calibration Date		14-Jul-1		Siope, ilio			3.3 x 298 /		
Next Calibration Date		14-Jul-1			=		$Q_{std} + b_c$	'a)	
None Gambianoni Bato		110011				III C X	Std 1 D c		
				Calibration of	1			Ī	
Calibration		nometer R	_	Q st		Continu	ious Flow		IC
Point	H (i	inches of	water)	(m ³ / m	•		rder, W	(W(P _a /	1013.3x298/T _a) ^{1/2} /35.31)
	(up)	(down)	(difference)	X-ax	X-axis (CF		(CFM)		Y-axis
1	6.4	6.4	12.8	1.819	.8195 60		60		60.7683
2	5.0	5.0	10.0	1.608	32		55		55.7042
3	3.8	3.8	7.6	1.402	20		46		46.5890
4	2.2	2.2	4.4	1.066	38	;	36		36.4610
5	1.4	1.4	2.8	0.85	1	;	30		30.3841
By Linear Regression of	Y on X								
	Slope, m	=	32.25	546	Inte	rcept, b =	2	.4526	
Correlation Co	pefficient*	=	0.99	72					
Calibration	Accepted	=	Yes/	Ne**					
* if Correlation Coefficier	st < 0.000	shock and	l rocalibration	a again					
ii Correlation Coemiciei	11 < 0.990,	, check and	recalibration	i agaiii.					
** Delete as appropriate.									
Remarks :									
Calibrated by	L	uLu Mar				Checked	l by	:	Derek Lo
Date :	1.	2-Feb-15				Date		:	12-Feb-15



				_		-	-	-	
Location :		CMA3a				Calbrati	on Date	:	18-Dec-14
Equipment no.		EL333				Calbrati	on Due Date	:	18-Feb-15
CALIBRATION OF CON	ITINUOUS	S FLOW RI	ECORDER						
				Ambient Co	ndition				
Temperature, T _a		287	,	Kelvin F	ressure, P	a	1	1026	mmHg
			Orifica Tr	ansfer Stan	dard Inforn	nation			
Equipment No.		EL086		Slope, m _c	1.991		Intercept, bc	Т	-0.00041
Last Calibration Date		14-Jul-1		olope, m _c			3.3 x 298 /		
Next Calibration Date		14-Jul-1			=		$Q_{std} + b_c$	' a /	
							≺ sta · ≈ c		
	l	_		Calibration					
Calibration		nometer R		Q			ious Flow		IC
Point		inches of			,		rder, W	(W(P _a /1	1013.3x298/T _a) ^{1/2} /35.31)
_	(up)	(down)	(difference)				(CFM)		Y-axis
1	5.5	5.5	11.0		.7076 56				57.4196
2	4.3	4.3	8.6	1.5			47		48.1914
3	3.2	3.2	6.4	1.3			44		45.1154
4	2.5	2.5	5.0	1.1			38		38.9633
5	1.2	1.2	2.4	0.7	977		25		25.6337
By Linear Regression of								40=0	
	Slope, m		33.6		Inte	ercept, b =	-0	.4658	
Correlation Co		=	0.99						
Calibration	Accepted	=	Yes/f	N0 ^^					
* if Correlation Coefficier	nt < 0.990,	, check and	d recalibration	n again.					
** Delete as appropriate.									
Remarks :									
Calibrated by		lenry Lau				Checked	d by	:	Derek Lo
Date :	1	8-Dec-14				Date		:	18-Dec-14



				_		-	-	-	
Location :		CMA3a				Calbrati	on Date	:	12-Feb-15
Equipment no.		EL333				Calbrati	on Due Date	:	12-Apr-15
CALIBRATION OF CON	ITINUOUS	S FLOW RI	ECORDER						
				Ambient Co	ndition				
Temperature, T _a		290	1	Kelvin P	ressure, P	a	1	1018	mmHg
			Orifica Tr	ansfer Stand	dard Inform	nation			
Equipment No.		EL086		Slope, m _c	1.9917		Intercept, bc		-0.00041
Last Calibration Date		14-Jul-1		olope, III _c			3.3 x 298 /		
Next Calibration Date		14-Jul-1			($Q_{std} + b_c$	' a)	
None Gambianoni Bato		110011				III C X	Std 1 D c		
				Calibration	1				
Calibration		nometer R	_	Q,			ious Flow		IC
Point	H (i	inches of	water)	(m ³ / ı	, , ,		rder, W	(W(P _a /1	013.3x298/T _a) ^{1/2} /35.31)
	(up)	(down)	(difference)	X-a	X-axis		FM)		Y-axis
1	6.0	6.0	12.0	1.76	1.7673		52		52.8345
2	4.7	4.7	9.4	1.56	42	47			47.7542
3	3.6	3.6	7.2	1.36	90	41			41.6579
4	2.3	2.3	4.6	1.09	43		35		35.5617
5	1.4	1.4	2.8	0.85	38		28		28.4493
By Linear Regression of	Y on X								
	Slope, m	=	26.4	964	Inte	ercept, b =	6.	0181	
Correlation Co	pefficient*	=	0.99	989					
Calibration	Accepted	=	Yes/F	\0 **					
* if Correlation Coefficier	st < 0.000	shock and	l rocalibratio	a again					
ii Correlation Coemiciei	11 < 0.990,	, check and	recalibration	i ayaiii.					
** Delete as appropriate.									
Remarks :									
Calibrated by	L	_uLu Mar				Checked	d by	:	Derek Lo
Date :	1.	2-Feb-15				Date		:	12-Feb-15



Location	:	CMA4a	Calbration Date	:	18-Dec-14
Equipment no.	:	EL390	Calbration Due Date	:	18-Feb-15
			-		

CALIBRATION OF CONTINUOUS FLOW RECORDER

Ambient Condition							
Temperature, T _a	287	Kelvin	Pressure, P _a	1026	mmHg		

Orifice Transfer Standard Information									
Equipment No. EL086 Slope, m _c 1.99175 Intercept, bc -0.00041									
Last Calibration Date	14-Jul-14	$(HxP_a/1013.3x298/T_a)^{1/2}$							
Next Calibration Date	14-Jul-15	$= m_c \times Q_{std} + b_c$							

	Calibration of TSP									
Calibration	Mar	nometer R	eading	Q _{std}	Continuous Flow	IC				
Point	H (i	inches of	water)	(m ³ / min.)	Recorder, W	(W(P _a /1013.3x298/T _a) ^{1/2} /35.31)				
	(up)	(down)	(difference)	X-axis	(CFM)	Y-axis				
1	6.0	6.0	12.0	1.7835	65	66.6477				
2	4.7	4.7	9.4	1.5785	52	53.3182				
3	3.5	3.5	7.0	1.3622	45	46.1407				
4	2.2	2.2	4.4	1.0801	32	32.8112				
5	1.4	1.4	2.8	0.8616	27	27.6844				
By Linear Regression of	Y on X									
	Slope, m	=	41.92	297 Int	ercept, b = -1	0.5801				
Correlation Co	oefficient*	=	0.99	001						
Calibration	Accepted	=	Yes/P	\\ 0 **						

 $[\]ensuremath{^*}$ if Correlation Coefficient < 0.990, check and recalibration again.

Remarks :						
Calibrated by	:	Henry Lau	_	Checked by	:	Derek Lo
Date	:	18-Dec-14	_	Date	:	18-Dec-14

^{**} Delete as appropriate.



Location	:	CMA4a	Calbration Date	:	12-Feb-15
Equipment no.	:	EL390	Calbration Due Date	:	12-Apr-15
				•	_

CALIBRATION OF CONTINUOUS FLOW RECORDER

Ambient Condition								
Temperature, T _a	290	Kelvin	Pressure, P _a	1018	mmHg			

Orifice Transfer Standard Information										
Equipment No.	lo. EL086 Slope, m _c 1.99175 Intercept, bc -0.00041									
Last Calibration Date	14-Jul-14	$(H \times P_a / 1013.3 \times 298 / T_a)^{1/2}$								
Next Calibration Date	14-Jul-15	$= m_c \times Q_{sid} + b_c$								

Calibration of TSP									
Calibration	Mar	nometer R	eading	Q _{std}	Continuous Flow	IC			
Point	H (i	inches of	water)	(m ³ / min.)	Recorder, W	(W(P _a /1013.3x298/T _a) ^{1/2} /35.31)			
	(up)	(down)	(difference)	X-axis	(CFM)	Y-axis			
1	6.5	6.5	13.0	1.8395	58	58.9308			
2	5.2	5.2	10.4	1.6453	51	51.8184			
3	4.1	4.1	8.2	1.4610	43	43.6900			
4	2.7	2.7	5.4	1.1856	30	30.4814			
5	1.3	1.3	2.6	0.8228	0.8228 22				
By Linear Regression of	Y on X								
	Slope, m	=	37.3	358 Int	ercept, b = -1	0.4734			
Correlation Co	efficient*	=	0.99	906					
Calibration Accepted = Yes/A		\\ 0 **							

 $[\]ensuremath{^*}$ if Correlation Coefficient < 0.990, check and recalibration again.

**	Delete	as	appropri	ate.
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LuLu Mar	Checked by	: Derek Lo
12-Feb-15	Date	: 12-Feb-15
		<u> </u>



Location :		CMA5b				Calbratio	on Date	: 04	-Dec-14
Equipment no.		EL222		Calbration Due Date : 04-Fe					-Feb-15
CALIBRATION OF COM	TIMUOUS	S EL OW DE	CORDER						
CALIBRATION OF CON	TINUUUS	S FLOW KI	CORDER						
	Ī			Ambient (ı		
Temperature, T _a		288		Kelvin	Pressure, P	а	1	021	mmHg
			Orifice T	ransfer Sta	andard Infor	mation			
Equipment No.		EL086		Slope, m _c	1.991	75	Intercept, bc	-0	0.00041
Last Calibration Date		14-Jul-1	4		(H)	κ P _a / 101	13.3 x 298 /	T _a) ^{1/2}	
Next Calibration Date		14-Jul-1	5		=	m _c x	$Q_{std} + b_c$		
Calibration of TSP									
Calibration	Mar	nometer R	eading	C	l _{std}	Continu	uous Flow		IC
Point	Н(inches of	water)	(m³ / min.) Recorder, W		(W(P _a /1013.3)	(298/T _a) ^{1/2} /35.31)		
	(up)	(down)	(difference)	X-	axis	(CFM)		Y-	axis
1	5.8	5.8	11.6	1.7	7462		60	61.	2642
2	4.6	4.6	9.2	1.5	5552		54	55.	.1378
3	3.5	3.5	7.0	1.3	3566		48	49.	.0114
4	2.3	2.3	4.6	1.0	0997		41	41.	.8639
5	1.4	1.4	2.8	0.0	3580		34	34.	.7164
By Linear Regression of	Y on X					<u> </u>		L	
	Slope, m	=	29.6	907	Int	ercept, b =	9.	1139	
Correlation Co	pefficient*	=	0.99	997					_
Calibration	Accepted	=	Yes/l	No**					
* if Correlation Coefficien	nt < 0.990,	check and	recalibration	again.					
** Delete as appropriate.									
Remarks :									

 Calibrated by
 :
 Henry Lau
 Checked by
 :
 Derek Lo

 Date
 :
 04-Dec-14
 Date
 :
 04-Dec-14



Location :		CMA5b				Calbratio	on Date	:	04-Feb-15
Equipment no.		EL222				Calbratio	on Due Date	:	04-Apr-15
								-	
CALIBRATION OF CON	TINUOUS	FLOW RE	CORDER						
				Ambient (Condition				
Temperature, T _a		289		Kelvin	Pressure, P	a	1	1024	mmHg
			Orifice T	ransfer Sta	andard Infor	mation			
Equipment No.		EL086		Slope, m _c	1.991	75	Intercept, bc		-0.00041
Last Calibration Date		14-Jul-1	4		(H)	(P _a / 101	3.3 x 298 /	/Τ _a) 1/2
Next Calibration Date		14-Jul-1	5		=	m _c x	$Q_{std} + b_c$		
				Calibratio	on of TSP				
Calibration	Mar	Manometer Reading		C	Q _{std} Continu		ious Flow IC		IC
Point	Н (inches of v	water)	(m ³	/ min.) Reco		der, W (W(P _a /1013.3x29		P _a /1013.3x298/T _a) ^{1/2} /35.31)
	(up)	(down)	(difference)	X-	axis	(CFM)		Y-axis	
1	5.4	5.4	10.8	1.6	6845	59			60.2271
2	4.4	4.4	8.8	1.5	5206	54			55.1231
3	3.4	3.4	6.8	1.3	3367	50			51.0399
4	2.2	2.2	4.4	1.0	0753	42			42.8736
5	1.4	1.4	2.8	0.8	3578	37		37.7696	
By Linear Regression of	Y on X								
	Slope, m	=	27.2	571	Inte	ercept, b =	14	.109	8
Correlation Co	pefficient*	=	0.99	987					
Calibration Accepted = Yes.		Yes/	Ne**						
* if Correlation Coefficien	t < 0.990,	check and	recalibration	n again.					
** Delete as appropriate.									
Remarks :									

Checked by

Date

Derek Lo

04-Feb-15

LuLu Mar

04-Feb-15

Calibrated by

Date



Location :	: MA1e					Calbratio	:	18-Dec-14	
Equipment no.		EL455				Calbratio	on Due Date	:	18-Feb-15
CALIBRATION OF CON	ITINUOUS	S FLOW RI	FCORDER						
SALIBRATION OF CON	11110000	TEGW ICI	EGORDEN	Ambient Con	dition				
Temperature, T _a		287	,	Kelvin Pre			1	026	mmHg
Tomporataro, Ta		201		TCIVIII 1 10		a	'		
	ı		Orifice T	ransfer Standa	ard Infori	mation			
Equipment No.		EL086		Slope, m _c	1.9917				-0.00041
Last Calibration Date		14-Jul-1	4		(Hx	$P_a/101$	13.3 x 298 /	$T_a)^{1/2}$	2
Next Calibration Date		14-Jul-1	5		=	m _c x	$Q_{std} + b_c$		
				Calibration o	f TSP				
Calibration	Mar	nometer R	eading	Q _{std}		Contin	uous Flow		IC
Point	Н (і	inches of	water)	(m³ / mi	n.)	Recorder, W		(W(P _a /10	013.3x298/T _a) ^{1/2} /35.31)
	(up)	(down)	(difference)	X-axis	5	(CFM)			Y-axis
1	6.5	6.5	13.0	1.8563	3	64			65.6224
2	5.0	5.0	10.0	1.6281			53		54.3435
3	4.3	4.3	8.6	1.5099		47			48.1914
4	2.7	2.7	5.4	1.1965			32		32.8112
5	1.2	1.2	2.4	0.7977		20			20.5070
By Linear Regression of	Y on X	•	<u> </u>						
	Slope, m	=	43.0	414	Inte	ercept, b =	-15	.8646	
Correlation Co	pefficient*	=	0.99	939					
Calibration	Accepted	=	Yes/ł	\\o **					
* if Correlation Coefficier	nt < 0.990,	check and	d recalibration	n again.					
** Delete as appropriate.									
Remarks :									
	Ц	lenry Lau				Checked	l by		Derek Lo
Calibrated by		8-Dec-14				Date	. ,	. —	18-Dec-14
18-Dec-14				-410			.0 000 17		



Location :		MA1e				Calbrat	: 12-Feb-15	
Equipment no. :	: EL455				Calbrat	ion Due Date	: 12-Apr-15	
								-
CALIBRATION OF CON	ITINUOUS	FLOW RI	ECORDER					
				Ambien	Condition			
Temperature, T _a	290 Kelvin Pressure , P _a						10	18 mmHg
			Orifice	Transfer S	tandard Info	ormation		
Equipment No.	Equipment No. EL086			Slope, m _c	1.991	75	Intercept, bc	-0.00041
Last Calibration Date		14-Jul-1	4		(H	x P _a / 1	013.3 x 298 / 7	Γ_a) $^{1/2}$
Next Calibration Date		14-Jul-1	5		=		$x Q_{std} + b_c$	
				Calibrat	ion of TSP			
Calibration	Man	ometer R	eading	C) _{std}	Continuous Flow		IC
Point	H (i	nches of	water)	(m ³ / min.)		Recorder, W		(W(P _a /1013.3x298/T _a) ^{1/2} /35.31)
	(up)	(down)	(difference)	X-	axis	(CFM)		Y-axis
1	6.6	6.6	13.2	1.	8536	65		66.0431
2	5.3	5.3	10.6	1.	6611	55		55.8826
3	4.0	4.0	8.0	1.	4431	47		47.7542
4	2.6	2.6	5.2	1.	1635	34		34.5456
5	1.6	1.6	3.2	0.	9128	29		29.4654
By Linear Regression of	Y on X							
	Slope, m	=	39.5	296	Int	ercept, b =	-8.8	717
Correlation Co	pefficient*	=	0.99	914				
Calibration	Accepted	=	Yes/	Ne**				
* if Correlation Coefficier	nt < 0.990.	check and	d recalibratio	n again				
	0.000,		. 1004	aga				
** Delete as appropriate.								
Remarks :								
Calibrated by	L	uLu Mar				Checke	d by	: Derek Lo
. Date	1:	2-Feb-15				Date		: 12-Feb-15



Location :		MA1w			Calbrati	on Date	:	18-Dec-14
Equipment no.		EL080			Calbrati	on Due Date	:	18-Feb-15
CALIBRATION OF CON	TINUOUS	S EL OW RE	-CORDER					
OALIBRATION OF GOIL	11110000	T EOW IN		Ambient Condition				
Townserstone T		007		Ambient Condition			000	and le
Temperature, T _a		287		Kelvin Pressure , P	a		026	mmHg
			Orifice Tr	ansfer Standard Infor	mation			
Equipment No.		EL086		Slope, m _c 1.991		Intercept, bc		-0.00041
Last Calibration Date		14-Jul-1	4	(H)	(P _a / 10	13.3 x 298 /	$T_a)^{1/2}$	2
Next Calibration Date		14-Jul-1	5	=	m _c x	$Q_{std} + b_c$		
				Calibration of TSP				
Calibration	Mar	nometer Re	eading	Q _{std}	Contin	Continuous Flow		IC
Point	Н (і	inches of v	water)	(m ³ / min.)	Recorder, W		(W(P _a /10	013.3x298/T _a) ^{1/2} /35.31)
	(up)	(down)	(difference)	X-axis	(CFM)			Y-axis
1	5.9	5.9	11.8	1.7686	56			57.4196
2	4.6	4.6	9.2	1.5617		45		46.1407
3	3.8	3.8	7.6	1.4194	38			38.9633
4	2.6	2.6	5.2	1.1741	27			27.6844
5	1.7	1.7	3.4	0.9494	19			19.4816
By Linear Regression of	Y on X							
	Slope, m	=	46.30	683 Int	ercept, b =	-25	.8022	
Correlation Co	pefficient*	=	0.99	970				
Calibration	Accepted	=	Yes/	No**				
* if Correlation Coefficien	nt < 0.990,	check and	l recalibration	n again.				
** Delete as appropriate.								
Remarks :								
Calibrated by:	Н	lenry Lau			Checked	d by	:	Derek Lo
Calibrated by Date		8-Dec-14			Date		:	18-Dec-14



Location :		MA1w				: 12-Feb-15	12-Feb-15		
Equipment no.	: EL080					Calbrat	on Due Date	: 12-Apr-15	
CALIBRATION OF CON	ITINUOUS	FLOW RI	ECORDER						
				Ambient	Condition				
Temperature, T _a	290 Kelvin Pres					a	10	18 mm	ıHg
			Orifice ⁻	Transfer S	tandard Info	rmation			
Equipment No.		EL086		Slope, m _c	1.991	75	Intercept, bc	-0.00041	
Last Calibration Date		14-Jul-1	4		(H	x P _a / 10)13.3 x 298 /	$T_a)^{1/2}$	
Next Calibration Date		14-Jul-1	5		=		$x Q_{std} + b_c$		
				Calibrati	ion of TSP				
Calibration	Mar	nometer R	eading	C	Q _{std}	Continuous Flow		IC	
Point	H (i	inches of	water)	(m ³	/ min.)	Recorder, W		(W(P _a /1013.3x298/T _a) ^{1/2}	² /35.31)
	(up)	(down)	(difference)	X-	-axis	(CFM)		Y-axis	
1	6.2	6.2	12.4	1.	7966	54		54.8666	
2	4.9	4.9	9.8	1.	5972	48		48.7703	
3	3.9	3.9	7.8	1.	4249	41		41.6579	
4	2.5	2.5	5.0	1.	1409	31		31.4975	
5	1.4	1.4	2.8	0.8538		22		22.3530	
By Linear Regression of	Y on X								
	Slope, m	=	35.0	762	Int	ercept, b =	-7.9	680	
Correlation Co	pefficient*	=	0.99	992	<u>.</u>				
Calibration	Accepted	=	Yes/	No**	-				
* if Correlation Coefficier	nt < 0.990,	check and	d recalibratio	n again.					
** Delete as appropriate.									
Remarks :									
Calibrated by		uLu Mar				Checke	d by	: Derek Lo	
Date :	1	2-Feb-15				Date		: 12-Feb-15	,