

G/F, 9/F, 12/F, 13/F, & 20/F, Leader Centre, 37 Wong Chuk Hang Road, Aberdeen, Hong Kong. 香港 黃竹坑 道 3 7 號 利達中心地下,9 樓,1 2 樓,1 3 樓及 2 0 樓 E-mail: smec@cigismec.com Website: www.cigismec.com

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



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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	1.00
	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	

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



G/F, 9/F, 12/F, 13/F. & 20/F., Leader Centre, 37 Wong Chuk Hang Road, Aberdeen, Hong Kong. 香港黄竹坑道37號利達中心地下,9樓,12樓,13樓及20樓 E-mail: smec@cigismec.com Website: www.cigismec.com



CERTIFICATE OF CALIBRATION

Certificate No.:

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Tel: (852) 2873 6860

Fax: (852) 2555 7533

2

of

Item tested

Description: Manufacturer: Acoustical Calibrator (Class 1)

Type/Model No.: Serial/Equipment No.: Rion Co., Ltd. NC-73 10465798

Adaptors used:

10

Item submitted by

Curstomer:

Lam Geotechnics Ltd.

Address of Customer:

Request No.: Date of receipt:

28-May-2015

Date of test:

30-May-2015

Reference equipment used in the calibration

Description:	Model:	Serial No.	Expiry Date:	Traceable to:
Lab standard microphone	B&K 4180	2341427	15-Apr-2016	SCL
Preamplifier	B&K 2673	2239857	22-Apr-2016	CEPREI
Measuring amplifier	B&K 2610	2346941	22-Apr-2016	CEPREI
Signal generator	DS 360	61227	16-Apr-2016	CEPREI
Digital multi-meter	34401A	US36087050	17-Apr-2016	CEPREI
Audio analyzer	8903B	GB41300350	17-Apr-2016	CEPREI
Universal counter	53132A	MY40003662	16-Apr-2016	CEPREI

Ambient conditions

Temperature: 21 ± 1 °C Relative humidity: 60 ± 10 % Air pressure: 1000 ± 5 hPa

Test specifications

- 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.
- 3, The results are rounded to the nearest 0.01 dB and 0.1 Hz and have not been corrected for variations from a reference pressure of 1013.25 hectoPascals as the maker's information indicates that the instrument is insensitive to pressure changes.

Test results

This is to certify that the sound calibrator conforms to the requirements of annex B of IEC 60942: 1997 for the conditions under which the test was performed. This does not imply that the sound calibrator meets IEC 60942 under any other conditions.

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

n/Feng Jun Qi

Huano Jian

Approved Signatory:

Date: 01-Jun-2015

Company Chos

SENGINEER SENGI

Comments: The results reported in this 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



G/F., 9/F., 12/F., 13/F. & 20/F., Leader Centre, 37 Wong Chuk Hang Road, Aberdeen, Hong Kong. 香港黃竹坑道37號利達中心地下,9樓,12樓,13樓及20樓 E-mail: smec@cigismec.com Website: www.cigismec.com

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



CERTIFICATE OF CALIBRATION

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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.

Frequency	Output Sound Pressure	Measured Output	Estimated Expanded		
Shown	Level Setting	Sound Pressure Level	Uncertainty		
Hz	dB	dB	dB		
1000	94.00	94.06	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 = 0.002 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 = 966.3 Hz

Estimated expanded uncertainty

0.1 Hz

Coverage factor k = 2.2

Total Noise and Distortion 4,

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 = 0.5 %

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

Fung Chi Yip

Checked by:

Lam Tze Wai

Date:

30-May-2015

Date:

01-Jun-2015

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.



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

	Tisch	Rootsmeter Orifice I.I		0005	Pa (mm) -	749.3
PLATE OR Run #	VOLUME START (m3)	VOLUME STOP (m3)	DIFF VOLUME (m3)	DIFF TIME (min)	METER DIFF Hg (mm)	ORFICE DIFF H2O (in.)
1 2 3 4 5	NA NA NA NA NA	NA NA NA NA NA	1.00 1.00 1.00 1.00	1.3930 0.9800 0.8790 0.8350 0.6900	3.2 6.4 7.9 8.7 12.7	2.00 4.00 5.00 5.50 8.00

DATA TABULATION

Vstd	(x axis) Qstd	(y axis)	Va	(x axis) Qa	(y axis)
0.9883 0.9841 0.9820 0.9810 0.9757	0.7095 1.0042 1.1172 1.1749 1.4141	1.4090 1.9926 2.2278 2.3365 2.8179	0.9957 0.9915 0.9894 0.9884 0.9830	0.7148 1.0117 1.1256 1.1837 1.4247	0.8889 1.2570 1.4054 1.4740 1.7777
Ostd slop intercept coefficient y axis =	t (b) = ent (r) =	2.00072 -0.01209 0.99995 Pa/760)(298/Ta)]	Qa slope intercept coefficie y axis =	= (b) $=$	1.25282 -0.00763 0.99995

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



Lam Geotechincs Limited

Location :		CMA1b			Calbration	on Date	: 10-Aug-15
Equipment no.		EL452			Calbration	on Due Date	: 10-Oct-15
CALIBRATION OF CON	TINUOUS	FLOW RE	CORDER				
				Ambient Condition			
Temperature, T _a		301		Kelvin Pressure ,	Pa	1	005 mmHg
			Orifice Tr	ansfer Standard Info	rmation		
Equipment No.		EL086		Slope, m _c 2.00072 Intercept, bc			-0.01209
Last Calibration Date	e 30-Jun-15			(H.	x P _a / 101	3.3 x 298 /	T_a) 1/2
Next Calibration Date $= m_c \times Q_{std} + b_c$							
				Calibration of TSP			
Calibration	Mar	ometer Re	eading	Q _{std}	Continu	uous Flow	IC
Point	H (i	nches of v	water)	(m ³ / min.)	Reco	rder, W	(W(P _a /1013.3x298/T _a) ^{1/2} /35.31)
	(up)	(down)	(difference)	X-axis	(0	CFM)	Y-axis
1	5.9	5.9	11.8	1.7074		60	59.4552
2	4.8	4.8	9.6	1.5406		52	51.5279
3	3.8	3.8	7.6	1.3714		45	44.5914
4	2.5	2.5	5.0	1.1135		36	35.6731
5	1.6	1.6	3.2	0.8920		28	27.7458
By Linear Regression of	Y on X						
	Slope, m	=	38.30	067 In	tercept, b =	-6.	9577
Correlation Co		=	0.99				
Calibration	Accepted	=	Yes/P	\0 **			
* if Correlation Coefficien	nt < 0.990,	check and	recalibration	n again.			
** Delete as appropriate.							
Remarks :							
	L	uLu Mar			Checked	l by	: Derek Lo
Calibrated by Date		0-Aug-15			Date	-	: 10-Aug-15



Location :		CMA1b			Calbration Date				2-Oct-15
Equipment no.		EL452				Calbratio	on Due Date	:	2-Dec-15
CALIBRATION OF CON	ITINUOUS	FLOW RI	ECORDER						
				Ambient C	ondition				
Temperature, T _a		301		Kelvin	Pressure, P	a	1	012	mmHg
			Orifice Tr	ansfer Sta	ndard Inforr	nation			
Equipment No.		EL086		Slope, m _c 2.00072 Intercept, bc			Т	-0.01209	
Last Calibration Date		30-Jun-1	5		(Нх	P _a / 101	3.3 x 298 /	T _a) 1	/2
Next Calibration Date $= m_c \times Q_{std} + b_c$									
				Calibratio	n of TSP				
Calibration	Man	ometer R	eading	C	std	Continu	Continuous Flow		IC
Point	H (i	nches of	water)	(m ³ / min.)		Reco	rder, W	(W(P _a /10	013.3x298/T _a) ^{1/2} /35.31)
	(up)	(down)	(difference)	X-axis		(C	FM)		Y-axis
1	5.8	5.8	11.6	1.6988		58			57.6732
2	4.2	4.2	8.4	1.4465		,	52	51.7070	
3	3.6	3.6	7.2	1.3	3396	45		44.7465	
4	2.3	2.3	4.6	1.0)720	36		35.7972	
5	1.4	1.4	2.8	0.8	3377	28			27.8422
By Linear Regression of	Y on X								
	Slope, m	=	35.69	958	Inte	ercept, b =	-2.	0989	
Correlation Co	oefficient*	=	0.99	143					
Calibration	Accepted	=	Yes/	\o **					
* if Correlation Coefficier	nt < 0.990.	check and	l recalibration	n again.					
				Ü					
** Delete as appropriate.									
Remarks :									
Calibrated by		Kit Au				Checked	by	:	Derek Lo
Data :	2	2-Oct-15				Date		:	2-Oct-15



Location :		CMA2a		Calbration Date : 10-Aug-15					10-Aug-15
Equipment no. :		EL449				Calbrati	on Due Date	:	10-Oct-15
CALIBRATION OF CONT	INUOUS	FLOW REC	CORDER						
				Ambient (Condition				
Temperature, T _a		301		Kelvin	Pressure, P	a	10	005	mmHg
			Orifice T	ransfer Sta	andard Infor	mation			
Equipment No.	nt No. EL086			Slope, m _c	2.000	72	Intercept, bc		-0.01209
Last Calibration Date		30-Jun-1	5		(H:	x P _a / 10)13.3 x 298 /	T_a) 1/2	2
Next Calibration Date		30-Jun-1	6		. =		$x Q_{std} + b_c$	α,	
				Calibratio	on of TSP				
Calibration	Mai	nometer R	eading	Q _{std}		Continuous Flow		IC	
Point	Н (inches of	water)	(m ³ / min.)		Red	order, W	(W(P _a /1	013.3x298/T _a) ^{1/2} /35.31)
	(up)	(down)	(difference)	X-axis			(CFM)		Y-axis
1	5.8	5.8	11.6	1.6929			59		58.4643
2	4.6	4.6	9.2	1.5083			50		49.5460
3	3.7	3.7	7.4	1.3534			43		42.6096
4	2.5	2.5	5.0	1.1135			34	33.6913	
5	1.5	1.5	3.0		8639			21.8003	
By Linear Regression of Y	on X								
2, 2oa tog. coo.c c	Slope, m	=	43.3	800	Inte	ercept, b =	-15	4622	
Correlation C	·	_	0.99			стоорт, в –			
		=							
Calibration	Accepted	=	Yes/	NO^^					
* if Correlation Coefficient	< 0.990, 0	check and i	recalibration	again.					
** Delete as appropriate.									
Remarks :									
Calibrated by	L	_uLu Mar				Checke	d by	:	Derek Lo
Date	1	0-Aug-15				Date		:	10-Aug-15



Location :		CMA2a		Calbration Date : 2-Oct-15						
Equipment no.		EL449				Calbratio	on Due Date	: 2-Dec-15		
CALIBRATION OF CONT	INUOUS I	FLOW RE	CORDER							
				Ambient (Condition					
Temperature, T _a		301		Kelvin	Pressure, P	12 mmHg				
			Orifice T	ransfer Sta	andard Infor	mation				
Equipment No.		EL086		Slope, m _c	2.000	72	Intercept, bc	-0.01209		
Last Calibration Date		30-Jun-1	5		(H:	x P _a / 10	13.3 x 298 / T	$98/T_a)^{1/2}$		
Next Calibration Date		30-Jun-1	$= m_c \times Q_{std} + b_c$							
				Calibratio	on of TSP					
Calibration	Mar	nometer R	eading	C	Q _{std} Continu		uous Flow	IC		
Point	Н (inches of	water)	(m ³ / min.)		Rec	order, W	(W(P _a /1013.3x298/T _a) ^{1/2} /35.31)		
	(up)	(down)	(difference)	X-axis		(CFM)		Y-axis		
1	5.7	5.7	11.4	1.6841		58		57.6732		
2	4.5	4.5	9.0	1.4971			50	49.7183		
3	3.4	3.4	6.8	1.3	3021		42	41.7634		
4	2.4	2.4	4.8	1.0	0949		38	37.7859		
5	1.5	1.5	3.0	0.8	8669		30	29.8310		
By Linear Regression of Y	on X									
	Slope, m	=	33.0	986	Int	ercept, b =	0.69	900		
Correlation C	oefficient*	=	0.99	926						
Calibration	Accepted	=	Yes/	\ 0**						
								_		
* if Correlation Coefficient	< 0.990. c	check and r	ecalibration	again.						
	,			3						
** Delete as appropriate.										
Remarks :										
Calibrated by		Kit Au				Checked	by	: Derek Lo		
Date :	2	2-Oct-15				Date		: 2-Oct-15		



Location :		CMA3a				Calbra	tion Date	:	10-Aug-15
Equipment no.		EL333				Calbra	tion Due Date	:	10-Oct-15
CALIBRATION OF CON	TINUOUS	FLOW RE	CORDER						
				Ambient C	ondition				
Temperature, T _a		301		Kelvin	Pressure, P	a		1005	mmHg
			Orifice Tra	ansfer Star	ndard Inforn	nation			
Equipment No.		EL086		Slope, m _c 2.00072 Intercept, bc					-0.01209
Last Calibration Date	t e 30-Jun-15				(Hx	P _a / 10)13.3 x 298 /	/ T _a)	1/2
Next Calibration Date		30-Jun-1	6		=		$x Q_{std} + b_c$		
				Calibration	n of TSP				
Calibration	Mar	nometer R	eading	Q	std	Conti	nuous Flow		IC
Point	Н (і	inches of	water)	(m ³ / min.)		Red	order, W	(W(P _a /1013.3x298/T _a) ^{1/2} /35.	
	(up)	(down)	(difference)) X-axis			(CFM)		Y-axis
1	5.6	5.6	11.2	1.6636			54		53.5097
2	4.6	4.6	9.2	1.5083			48		47.5642
3	3.6	3.6	7.2	1.3	3350	42			41.6187
4	2.4	2.4	4.8	1.0	912	34			33.6913
5	2.0	2.0	4.0	0.9	966		29		28.7367
By Linear Regression of	Y on X								
	Slope, m	=	35.9	922	Inte	ercept, b	= -6	.4472	
Correlation Co	pefficient*	=	0.99	984					
Calibration	Accepted	=	Yes/P	No**					
* if Correlation Coefficier	nt < 0.990,	check and	recalibration	n again.					
** Delete as appropriate.									
Remarks :									
Calibrated by	L	.uLu Mar				Check	ed by	:	Derek Lo
Date	1	0-Aug-15				Date		:	10-Aug-15



Date

				g			,,,	0.0.1.15	
Location :		CMA3a				ion Date	:	2-Oct-15	
Equipment no.		EL333			Calbrat	ion Due Date	:	2-Dec-15	
CALIBRATION OF CON	ITINUOUS	FLOW R	CORDER						
			,	Ambient Condition					
Temperature, T _a		301		Kelvin Pressure, P	a		1012	mmHg	
			Orifice Tra	ansfer Standard Inform	mation				
Equipment No.		EL086		Slope, m _c 2.000	72	Intercept, bc	bc -0.01209		
Last Calibration Date	30-Jun-15			(Hx	P _a / 10	13.3 x 298 /	T_a) ¹	/2	
Next Calibration Date									
				Calibration of TSP					
Calibration	Man	ometer R		Q _{std}	Contin	uous Flow		IC	
Point		nches of v	-	(m ³ / min.)	Reco	order, W	(W(P _a /10	013.3x298/T _a) ^{1/2} /35.31)	
	(up)	(down)	(difference)	X-axis	(CFM)			Y-axis	
1	5.5	5.5	11.0	1.6544	Ì	54		53.6957	
2	4.3	4.3	8.6	1.4635		48		47.7296	
3	3.3	3.3	6.6	1.2829	44			43.7521	
4	2.3	2.3	4.6	1.0720	38		37.7859		
5	1.4	1.4	2.8	0.8377		32		31.8197	
By Linear Regression of	Y on X								
	Slope, m	=	26.5	104 Int	tercept, b =	= 9.	.4978		
Correlation Co	oefficient*	=	0.99	91					
Calibration	Accepted	=	Yes/						
* if Correlation Coefficier	nt < 0.990,	check and	l recalibratior	n again.					
** Delete as appropriate.									
Remarks :									
·-···-·									
O-liberate d l		Kit Au			Checke	d by	:	Derek Lo	
Calibrated by	2	2-Oct-15			Date	-	:	2-Oct-15	



Location

Calibration Data for High Volume Sampler (TSP Sampler)

Calbration Date

10-Aug-15

Equipment no.		EL390				Calbr	ation Due Date	:	10-Oct-15
CALIBRATION OF CON	TINUOUS	FLOW RE	CORDER						
				Ambient C	ondition				
Temperature, T _a		301		Kelvin	Pressure, P	a		1005	mmHg
			Orifice Tr	ansfer Sta	ndard Inforr	nation			
Equipment No.		EL086		Slope, m _c	2.000	72	Intercept, bc	Т	-0.01209
Last Calibration Date		30-Jun-1	5		(H x	P _a / 1	013.3 x 298 /	(T _a)	1/2
Next Calibration Date		30-Jun-1	6		=		$x Q_{std} + b_c$		
				Calibration	n of TSP				
Calibration	Mar	nometer Re	eading	Q	std	Cont	inuous Flow		IC
Point	Н (inches of v	water)	(m ³ / min.)		Recorder, W		(W(P _a	/1013.3x298/T _a) ^{1/2} /35.3
	(up)	(down)	(difference)	X-axis		(CFM)			Y-axis
1	5.7	5.7	11.4	1.6783		58		57.4734	
2	4.6	4.6	9.2	1.5083		51			50.5370
3	3.6	3.6	7.2	1.3	3350	45		44.5914	
4	2.4	2.4	4.8	1.0	912	34			33.6913
5	1.5	1.5	3.0	0.8	3639	25			24.7730
By Linear Regression of	Y on X								
	Slope, m	=	40.2	813	Inte	ercept, b	= -9	.9646	
Correlation Co	efficient*	=	0.99	994					
Calibration	Accepted	=	Yes/f	No**					
* if Correlation Coefficier	nt < 0.990.	. check and	I recalibratio	n again.					
** Delete as appropriate.									
Remarks :									
Calibrated by	L	uLu Mar				Chec	ked by	:	Derek Lo
Date :	1	0-Aug-15				Date		:	10-Aug-15



Location :	CMA4a						ation Date	2-Oct-15	
Equipment no.		EL390				Calbr	ation Due Date	:	2-Dec-15
CALIBRATION OF CON	TINUOUS	FLOW RE	CORDER						
				Ambient C	ondition				
Temperature, T _a		301		Kelvin	Pressure, P	a		1012	mmHg
			Orifice Tr	ansfer Sta	ndard Inform	nation			
Equipment No.		EL086		Slope, m _c	2.000	72	Intercept, bo	;	-0.01209
Last Calibration Date		30-Jun-1	5		(Hx	P _a / 1	013.3 x 298	/T _a) 1	1/2
Next Calibration Date		30-Jun-1	6		-		$x Q_{std} + b_c$		
				<u> </u>					
- ··· ·				Calibratio					
Calibration		nometer Re	_				inuous Flow		IC
Point	H (inches of v	•		(m³ / min.)		corder, W	(W(P _a /1	1013.3x298/T _a) ^{1/2} /35.31
	(up)	(down)	(difference)	X-axis		(CFM)		Y-axis	
1	6.1	6.1	12.2	1.7420		58		57.6732	
2	4.9	4.9	9.8	1.5619		50		49.7183	
3	4.0	4.0	8.0	1.	4118	44		43.7521	
4	2.6	2.6	5.2	1.	1394	34			33.8084
5	1.7	1.7	3.4	0.9	9225		28		27.8422
By Linear Regression of	Y on X								
	Slope, m	=	36.4	494	Int	ercept, b	= -6	6.8487	
Correlation Co	oefficient*	=	0.99	967					
Calibration	Accepted	=	Yes/l	No**					
* if Correlation Coefficien	t < 0.990,	check and	recalibration	again.					
** Delete as appropriate.									
Remarks :									
<u></u>									
Calibrated by		Kit Au				Check	red by	:	Derek Lo
Date :		2-Oct-15				Date		:	2-Oct-15



Location :		CMA5b				Calbratio	n Date	:	01-Aug-15
Equipment no.		EL222		Calbration Due Date : 01-C					
CALIBRATION OF CON	TINUOUS	FLOW RE	CORDER						
				Ambient (Condition				
Temperature, T _a		302		Kelvin	Pressure, P	a	1	011	mmHg
			Orifice T	ransfer Sta	andard Infor	mation			
Equipment No.		EL086		Slope, m _c	2.000	72	Intercept, bc		-0.01209
Last Calibration Date		30-Jun-1	5		(H)	(P _a / 101	3.3 x 298 /	T _a) 1	/2
Next Calibration Date		30-Jun-16	6		=	$m_c x$	$Q_{std} + b_c$		
				Calibratio	on of TSP				
Calibration	Manometer Reading		C) _{std}	Continu	ious Flow		IC	
Point	H (i	inches of v	vater)	(m ³	/ min.) Recorder, W		rder, W	(W(P _a /1	013.3x298/T _a) ^{1/2} /35.31)
	(up)	(down)	(difference)	X-	C-axis (CF		FM)	Y-axis	
1	5.5	5.5	11.0	1.0	6509	60		59.5336	
2	4.3	4.3	8.6	1.4	4604	55			54.5725
3	3.4	3.4	6.8	1.:	2993		49		48.6191
4	2.3	2.3	4.6	1.0	0697		40		39.6891
5	1.5	1.5	3.0	0.8	8650	;	32		31.7513
By Linear Regression of	Y on X								
	Slope, m	=	35.9	878	Inte	ercept, b =	1.	1624	
Correlation Co	oefficient*	=	0.99	974					
Calibration	Accepted	=	Yes/f	√0 **					
* if Correlation Coefficien	it < 0.990,	check and	recalibration	again.					
** Delete as appropriate.									
Remarks :									
Calibrated by	L	uLu Mar				Checked	by	:	Derek Lo

Date

01-Aug-15

01-Aug-15

Date



Location :		CMA5b			Calbratio	on Date	: 2-Oct-15		
Equipment no.		EL222		Calbration Due Date : 2-Dec-					
CALIBRATION OF CON	ITINUOUS	S FLOW RI	ECORDER						
				Ambient Condition					
Temperature, T _a		301		Kelvin Pressure, P	a	1	012 mmHg		
			Orifice T	ransfer Standard Infor	mation				
Equipment No.		EL086		Slope, m _c 2.000		Intercept, bc	-0.01209		
Last Calibration Date		30-Jun-1				3.3 x 298 /			
Next Calibration Date		30-Jun-1	6			$Q_{std} + b_c$	<i>a)</i>		
				Calibration of TSP					
Calibration	Mar	nometer R	eading	Q _{std}	Continu	uous 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	5.8	5.8	11.6	1.6988	60		59.6619		
2	4.6	4.6	9.2	1.5135	55		54.6901		
3	3.6	3.6	7.2	1.3396	50		49.7183		
4	2.4	2.4	4.8	1.0949	42		41.7634		
5	1.5	1.5	3.0	0.8669		34	33.8084		
By Linear Regression of Correlation Co Calibration	Slope, m	=	31.14 0.99 Yes/#	86	ercept, b =	7.3	3520		
* if Correlation Coefficier ** Delete as appropriate. Remarks:		check and	recalibration	n again.					
Calibrated by		Kit Au			Checked	by	: Derek Lo		
Date :		2-Oct-15			Date		: 2-Oct-15		



Location :		MA1e				Calbra	: 10-Aug-15			
Equipment no.		EL455				Calbra	: 10-Oct-15			
CALIBRATION OF CON	TINUOUS	FLOW RI	<u>ECORDER</u>							
				Ambient	Condition					
Temperature, T _a		301		Kelvin	Pressure, P	a	005 mmHg			
			Orifice 1	Transfer S	tandard Info	rmation				
Equipment No.		EL086		Slope, m _c	2.000	72	Intercept, bc	-0.01209		
Last Calibration Date		30-Jun-1	5		(H	x P _a / 1	P _a / 1013.3 x 298 / T _a) ^{1/2}			
Next Calibration Date		30-Jun-1	6		=		$x Q_{std} + b_c$			
				Calibrat	ion of TSP					
Calibration	Mar	nometer R	eading	C) _{std}	Continuous Flow		IC		
Point	H (i	inches of	water)	(m ³	³ / min.) Red		ecorder, W	(W(P _a /1013.3x298/T _a) ^{1/2} /35.31)		
	(up)	(down)	(difference)	X-	axis	ixis (CFM)		Y-axis		
1	6.3	6.3	12.6	1.7	1.7641		55	54.5006		
2	5.1	5.1	10.2	1.9	5878	52		51.5279		
3	3.9	3.9	7.8	1.3	3893	43		42.6096		
4	2.5	2.5	5.0	1.	1135	37		36.6641		
5	1.6	1.6	3.2	0.8	8920	29		28.7367		
By Linear Regression of	Y on X									
	Slope, m	=	29.8	941	Inte	ercept, b	= 2.4	698		
Correlation Co	efficient*	=	0.99	933						
Calibration	Accepted	=	Yes/	Ne**						
* if Correlation Coefficien	nt < 0.990.	check and	l recalibration	n again.						
		onoon and	. roodiiordiio	aga						
** Delete as appropriate.										
Remarks :										
Calibrated by	L	uLu Mar				Check	ed by	: Derek Lo		
Date	1	0-Aug-15	-			Date		: 10-Aug-15		



Location :	MA1e						Calbration Date :				
Equipment no.		EL455			Calbration Due Date :				2-Dec-15		
CALIBRATION OF CON	ITINUOUS	S FLOW RI	ECORDER								
				Ambient	Condition						
Temperature, T _a		301		Kelvin	Pressure, P	a	10	12	mmHg		
			Orifice	Transfer S	tandard Info	rmation					
Equipment No.		EL086		Slope, m _c	2.000	72	Intercept, bc	\top	-0.01209		
Last Calibration Date		30-Jun-1	5		(H	x P _a / 1	013.3 x 298 / T	$T_a)^{1/2}$	/2		
Next Calibration Date		30-Jun-1	6		=	m _c	$x Q_{std} + b_c$				
				Calibrat	ion of TSP						
Calibration	Mar	ometer R	eading	C	Q std Continuous Flow			IC			
Point	H (i	inches of	water)	(m ³	(m ³ / min.)		Recorder, W		/1013.3x298/T _a) ^{1/2} /35.31)		
	(up)	(down)	(difference)	X-axis		(CFM)		Y-axis			
1	6.4	6.4	12.8	1.7842		58		57.6732			
2	5.5	5.5	11.0	1.6544		52		51.7070			
3	4.2	4.2	8.4	1.4	4465	46		45.7408			
4	2.6	2.6	5.2	1.	1394	38		37.7859			
5	1.6	1.6	3.2	0.8	3951	30		29.8310			
By Linear Regression of	Y on X										
	Slope, m	=	30.0	584	Int	ercept, b =	2.9	492			
Correlation Co	oefficient*	=	0.99	970							
Calibration	Accepted	=	Yes/l	Vo**							
if Correlation Coefficier	st < 0.000	chock and	l rocalibratio	n again							
ii Correlation Coefficier	ii < 0.990,	CHECK AND	recalibratio	ii ayaiii.							
** Delete as appropriate.											
Remarks :											
Calibrated by		Kit Au				Checke	d by	:	Derek Lo		
Date :		2-Oct-15				Date		:	2-Oct-15		



Location :		MA1w			Calbration Date : 10				
Equipment no.		EL080			Calbrat	: 10-Oct-15			
CALIBRATION OF CON	TINUOUS	FI OW RI	CORDER						
SALIBRATION OF SON	11110000	1 2011 10	<u> </u>	Ambient Condition					
Temperature, T _a		301		Kelvin Pressure, F	.	10	005 mmHg		
Temperature, 1 _a		301		Reiviii Fressure, F	а	10	- Illing		
			Orifice T	ransfer Standard Info	rmation				
Equipment No.		EL086		Slope , m _c 2.000		Intercept, bc	-0.01209		
Last Calibration Date		30-Jun-1	5	(H	x P _a / 10	013.3 x 298 /	$T_a)^{1/2}$		
Next Calibration Date		30-Jun-1	6	=	m_c	$x Q_{std} + b_c$			
				Calibration of TSP					
Calibration	Man	ometer R	eading	Q _{std}	Continuous Flow		IC		
Point	H (i	nches of	water)	(m ³ / min.)	m³ / min.) Recorder		(W(P _a /1013.3x298/T _a) ^{1/2} /35.31)		
	(up)	(down)	(difference)	X-axis	(CFM)		Y-axis		
1	6.3	6.3	12.6	1.7641	55		54.5006		
2	5.1	5.1	10.2	1.5878	50		49.5460		
3	3.9	3.9	7.8	1.3893	42		41.6187		
4	2.4	2.4	4.8	1.0912	32		31.7095		
5	1.5	1.5	3.0	0.8639	25		24.7730		
By Linear Regression of	Y on X		<u> </u>						
	Slope, m	=	33.6	445 Int	ercept, b =	-4.6	5291		
Correlation Co	pefficient*	=	0.99	91					
Calibration		=	Yes/						
	·								
* if Correlation Coefficier	nt < 0.990,	check and	l recalibration	n again.					
** Delete as appropriate.									
Remarks :									
					<u> </u>				
Calibrated by		uLu Mar			Checke	d by	: Derek Lo		
Date :	10	10-Aug-15			Date	: 10-Aug-15			



Location :		MA1w				Calbration Date :				
Equipment no.		EL080			Calbration Due Date :				2-Dec-15	
CALIBRATION OF CON	ITINUOUS	FLOW R	ECORDER							
				Ambient	Condition					
Temperature, T _a		301		Kelvin	Pressure, P	a	10)12	mmHg	
			Orifice 7	Fransfer S	tandard Info	rmation				
Equipment No.		EL086		Slope, m _c	2.000	72	Intercept, bc		-0.01209	
Last Calibration Date		30-Jun-1	5		(H	x P _a / 10)13.3 x 298 /	$T_a)^{1/2}$		
Next Calibration Date		30-Jun-1	6		=	m _c	$x Q_{std} + b_c$			
				Calibrati	ion of TSP					
Calibration	Man	ometer R	eading	C	Q _{std} Continuous Flow			IC		
Point	H (i	nches of	water)	(m ³	Recorde		Recorder, W		013.3x298/T _a) ^{1/2} /35.31)	
	(up)	(down)	(difference)	χ.	-axis (C		(CFM)		Y-axis	
1	6.3	6.3	12.6	1.	1.7702		58	57.6732		
2	5.1	5.1	10.2	1.	1.5933		50		49.7183	
3	4.0	4.0	8.0	1.	4118	42		41.7634		
4	2.4	2.4	4.8	1.	0949	32		31.8197		
5	1.5	1.5	3.0	0.	8669		25		24.8591	
By Linear Regression of	Y on X									
	Slope, m	=	35.9	011	. Int	ercept, b =	-7.2	2075		
Correlation Co	pefficient*	=	0.99	959						
Calibration	Accepted	=	Yes/	No**	<u>.</u>					
* if Correlation Coefficier	nt < 0.990,	check and	l recalibratio	n again.						
				Ü						
** Delete as appropriate.										
Remarks :										
Calibrated by		Kit Au				Checke	d by	:	Derek Lo	
Date :	2	2-Oct-15				Date		:	2-Oct-15	