

ORIFICE TRANSFER STANDARD CERTIFICATION WORKSHEET TE-5025A

Date - Jan 14, 2016 Rootsmeter S/N 0438320 Ta (K) - 292
Operator Tisch Orifice I.D. - 2456 Pa (mm) - 748.03

PLATE OR Run #	VOLUME START (m3)	VOLUME STOP (m3)	DIFF VOLUME (m3)	DIFF TIME (min)	METER DIFF Hg (mm)	ORFICE DIFF H2O (in.)
1	NA	NA	1.00	1.4420	3.2	2.00
2	NA	NA	1.00	1.0220	6.4	4.00
3	NA	NA	1.00	0.9130	7.9	5.00
4	NA	NA	1.00	0.8670	8.8	5.50
5	NA	NA	1.00	0.7170	12.7	8.00

DATA TABULATION

Vstd	(x axis) Qstd	(y axis)	Va	(x axis) Qa	(y axis)
1.0002	0.6936	1.4174	0.9957	0.6905	0.8836
0.9959	0.9745	2.0045	0.9915	0.9701	1.2496
0.9938	1.0885	2.2411	0.9893	1.0836	1.3971
0.9926	1.1449	2.3504	0.9882	1.1398	1.4653
0.9874	1.3771	2.8347	0.9830	1.3710	1.7672
Qstd slope (m) = 2.07173			Qa slope (m) = 1.29728		
intercept (b) = -0.01761			intercept (b) = -0.01098		
coefficient (r) = 0.99996			coefficient (r) = 0.99996		
y axis = $\text{SQRT}[\text{H}_2\text{O}(\text{Pa}/760)(298/\text{Ta})]$			y axis = $\text{SQRT}[\text{H}_2\text{O}(\text{Ta}/\text{Pa})]$		

CALCULATIONS

$$\text{Vstd} = \text{Diff. Vol}[(\text{Pa} - \text{Diff. Hg})/760](298/\text{Ta})$$

$$\text{Qstd} = \text{Vstd}/\text{Time}$$

$$\text{Va} = \text{Diff Vol}[(\text{Pa} - \text{Diff Hg})/\text{Pa}]$$

$$\text{Qa} = \text{Va}/\text{Time}$$

For subsequent flow rate calculations:

$$\text{Qstd} = 1/\text{m}\{[\text{SQRT}(\text{H}_2\text{O}(\text{Pa}/760)(298/\text{Ta}))] - b\}$$

$$\text{Qa} = 1/\text{m}\{[\text{SQRT}(\text{H}_2\text{O}(\text{Ta}/\text{Pa}))] - b\}$$

ORIFICE TRANSFER STANDARD CERTIFICATION WORKSHEET TE-5025A

Date - Jan 18, 2017 Rootmeter S/N 0438320 Ta (K) - 294
Operator Tisch Orifice I.D. - 2154 Pa (mm) - 755.65

PLATE OR Run #	VOLUME START (m3)	VOLUME STOP (m3)	DIFF VOLUME (m3)	DIFF TIME (min)	METER DIFF Hg (mm)	ORFICE DIFF H2O (in.)
1	NA	NA	1.00	1.4530	3.2	2.00
2	NA	NA	1.00	1.0420	6.4	4.00
3	NA	NA	1.00	0.9290	7.9	5.00
4	NA	NA	1.00	0.8840	8.8	5.50
5	NA	NA	1.00	0.7300	12.8	8.00

DATA TABULATION

Vstd	(x axis) Qstd	(y axis)	Va	(x axis) Qa	(y axis)
1.0035	0.6906	1.4197	0.9957	0.6853	0.8821
0.9993	0.9590	2.0078	0.9915	0.9516	1.2475
0.9972	1.0734	2.2448	0.9894	1.0651	1.3948
0.9960	1.1268	2.3543	0.9883	1.1180	1.4628
0.9907	1.3571	2.8394	0.9830	1.3466	1.7642
Qstd slope (m) = 2.12779			Qa slope (m) = 1.33238		
intercept (b) = -0.04273			intercept (b) = -0.02655		
coefficient (r) = 0.99982			coefficient (r) = 0.99982		
y axis = SQRT[H2O(Pa/760) (298/Ta)]			y axis = SQRT[H2O(Ta/Pa)]		

CALCULATIONS

Vstd = Diff. Vol [(Pa-Diff. Hg)/760] (298/Ta)
Qstd = Vstd/Time

Va = Diff Vol [(Pa-Diff Hg)/Pa]
Qa = Va/Time

For subsequent flow rate calculations:

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

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MaterialLab**TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET**

Project : Environmental Monitoring Works For Contract No. KLN/2015/07						Date of Calibration: 10-Jan-17	
Location : KER1b						Next Calibration Date: 7-Apr-17	
Brand: Tisch		S/N: 3482		Technician: Jimmy Lui			
Model: TE-5170							

CONDITIONS			
Sea Level Pressure (hPa):	1018.1	Corrected Pressure (mm Hg):	764
Temperature (°C):	19	Temperature (K):	292

CALIBRATION ORIFICE			
Make: Tisch	Qstd Slope:	2.07173	
Model: TE-5025A	Qstd Intercept:	-0.01761	
Calibration Date: 14-Jan-16	Expiry Date:	14-Jan-17	
S/N: 2456			

CALIBRATIONS							
Plate No.	H2O (L) (in)	H2O (R) (in)	H2O (in)	Qstd (m³/min)	I (chart)	IC (corrected)	LINEAR REGRESSION
18	-0.60	-11.60	11.000	1.630	59.00	59.76	Slope = 30.4307 Intercept = 11.3049 Corr. coeff.: 0.9952
13	-1.80	-10.40	8.600	1.442	56.00	56.72	
10	-2.80	-9.40	6.600	1.265	49.00	49.63	
7	-4.20	-7.90	3.700	0.949	40.00	40.52	
5	-4.70	-7.40	2.700	0.812	35.00	35.45	

Calculations:

$Qstd = 1/m[\sqrt{(H2O(Pa/Pstd)(Tstd/Ta))}-b]$

$IC = I[\sqrt{(Pa/Pstd)(Tstd/Ta)}$

Qstd = standard flow rate

IC = corrected chart response

I = actual chart response

m = calibrator Qstd slope

b = calibrator Qstd intercept

Ta = actual temperature during calibration (deg K)

Pa = actual pressure during calibration (mm Hg)

Tstd = 298 deg K

Pstd = 760 mm Hg

For subsequent calculation of sampler flow:

$1/m((I)[\sqrt{(298/Tav)(Pav/760)}]-b)$

m = sampler slope

b = sampler intercept

I = chart response

Tav = daily average temperature

Pav = daily average pressure

FLOW RATE CHART

CHOI KAM HO
Project Consultant

Report Date: 10th January, 2017

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Materialab**TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET**

Project : Environmental Monitoring Works For Contract No. KLN/2015/07
Location : KER1b
Brand: Tisch
Model: TE-5170 S/N: 3482
Date of Calibration: 7-Apr-17
Next Calibration Date: 6-Jul-17
Technician: Jimmy Lui

CONDITIONS

Sea Level Pressure (hPa): 1012.4 Corrected Pressure (mm Hg): 759
Temperature (°C): 25 Temperature (K): 298

CALIBRATION ORIFICE

Make: Tisch Qstd Slope: 2.12779
Model: TE-5025A Qstd Intercept: -0.04273
Calibration Date: 18-Jan-17 Expiry Date: 18-Jan-18
S/N: 2154

CALIBRATIONS

Plate No.	H2O (L) (in)	H2O (R) (in)	H2O (in)	Qstd (m ³ /min)	I (chart)	IC (corrected)	LINEAR REGRESSION
18	5.60	-6.30	11.900	1.640	56.00	55.96	Slope = 26.9764 Intercept = 11.3176 Corr. coeff.: 0.9977
13	4.30	-5.00	9.300	1.452	50.00	49.97	
10	3.20	-3.90	7.100	1.272	46.00	45.97	
7	1.90	-2.60	4.500	1.016	38.00	37.97	
5	1.10	-1.80	2.900	0.820	34.00	33.98	

Calculations:

$Qstd = 1/m[\sqrt{H2O(Pa/Pstd)}(Tstd/Ta)] - b$

$IC = I[\sqrt{Pa/Pstd)}(Tstd/Ta)]$

Qstd = standard flow rate

IC = corrected chart response

I = actual chart response

m = calibrator Qstd slope

b = calibrator Qstd intercept

Ta = actual temperature during calibration (deg K)

Pa = actual pressure during calibration (mm Hg)

Tstd = 298 deg K

Pstd = 760 mm Hg

For subsequent calculation of sampler flow:

$1/m((I[\sqrt{298/Tav)}(Pav/760)] - b)$

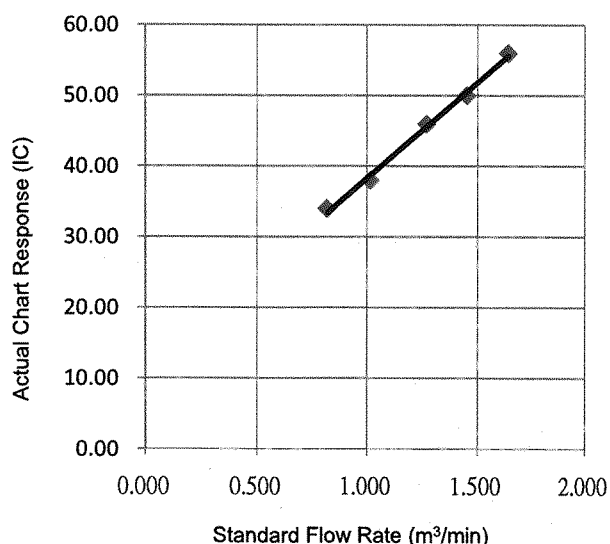
m = sampler slope

b = sampler intercept

I = chart response

Tav = daily average temperature

Pav = daily average pressure

FLOW RATE CHART

CHOI KAM HO
Project Consultant

Report Date: 7th April, 2017

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MaterialLab**TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET**

Project : Environmental Monitoring Works For Contract No. KLN/2015/07

Date of Calibration: 10-Jan-17

Location : KTD1a

Next Calibration Date: 7-Apr-17

Brand: Tisch

Technician: Jimmy Lui

Model: TE-5170

S/N: 4037

CONDITIONS

Sea Level Pressure (hPa): 1018.1 Corrected Pressure (mm Hg): 764
Temperature (°C): 19 Temperature (K): 292

CALIBRATION ORIFICE

Make: Tisch Qstd Slope: 2.07173
Model: TE-5025A Qstd Intercept: -0.01761
Calibration Date: 14-Jan-16 Expiry Date: 14-Jan-17
S/N: 2456

CALIBRATIONS

Plate No.	H2O (L) (in)	H2O (R) (in)	H2O (in)	Qstd (m ³ /min)	I (chart)	IC (corrected)	LINEAR REGRESSION
18	0.40	-12.50	12.900	1.764	52.00	52.67	Slope = 33.2726
13	-0.80	-11.40	10.600	1.600	48.00	48.62	Intercept = -4.9783
10	-2.20	-9.90	7.700	1.365	41.00	41.53	Corr. coeff.: 0.9963
7	-3.50	-8.50	5.000	1.102	32.00	32.41	
5	-4.40	-7.60	3.200	0.883	23.00	23.30	

Calculations: $Qstd = 1/m[\sqrt{(H2O(Pa/Pstd)(Tstd/Ta))}-b]$ $IC = I[\sqrt{(Pa/Pstd)(Tstd/Ta)}]$

Qstd = standard flow rate

IC = corrected chart response

I = actual chart response

m = calibrator Qstd slope

b = calibrator Qstd intercept

Ta = actual temperature during calibration (deg K)

Pa = actual pressure during calibration (mm Hg)

Tstd = 298 deg K

Pstd = 760 mm Hg

For subsequent calculation of sampler flow: $1/m[(I)[\sqrt{(298/Tav)(Pav/760)}]-b]$

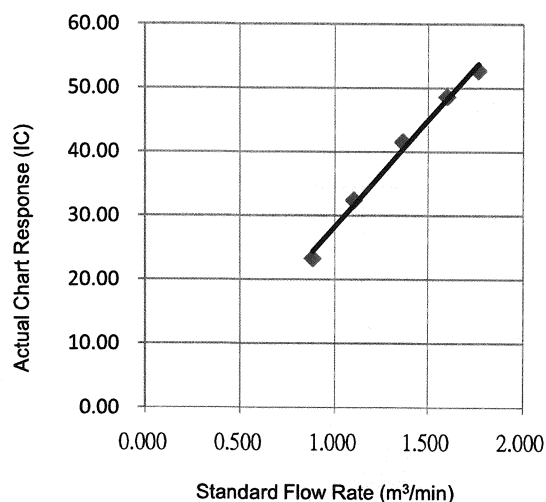
m = sampler slope

b = sampler intercept

I = chart response

Tav = daily average temperature

Pav = daily average pressure

FLOW RATE CHART

Signature
CHOI KAM HO
Project Consultant

Report Date: 10th January, 2017

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Materialab**TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET**

Project : Environmental Monitoring Works For Contract No. KLN/2015/07					Date of Calibration: 7-Apr-17		
Location : KTD1a					Next Calibration Date: 6-Jul-17		
Brand: Tisch		S/N: 4037		Technician: Jimmy Lui			
Model: TE-5170							

CONDITIONS			
Sea Level Pressure (hPa):	1012.4	Corrected Pressure (mm Hg):	759
Temperature (°C):	25	Temperature (K):	298

CALIBRATION ORIFICE			
Make: Tisch	Qstd Slope:	2.12779	
Model: TE-5025A	Qstd Intercept:	-0.04273	
Calibration Date: 18-Jan-17	Expiry Date:	18-Jan-18	
S/N: 2154			

CALIBRATIONS							
Plate No.	H2O (L) (in)	H2O (R) (in)	H2O (in)	Qstd (m ³ /min)	I (chart)	IC (corrected)	LINEAR REGRESSION
18	5.70	-6.30	12.000	1.647	53.00	52.97	Slope = 31.9356 Intercept = -0.1259 Corr. coeff.: 0.9974
13	4.50	-5.10	9.600	1.475	47.00	46.97	
10	3.40	-4.00	7.400	1.298	41.00	40.97	
7	2.00	-2.70	4.700	1.038	32.00	31.98	
5	1.10	-1.80	2.900	0.820	27.00	26.98	

Calculations:

Qstd = $1/m[\text{Sqrt}(\text{H2O}(\text{Pa}/\text{Pstd})(\text{Tstd}/\text{Ta})) - b]$

IC = $I[\text{Sqrt}(\text{Pa}/\text{Pstd})(\text{Tstd}/\text{Ta})]$

Qstd = standard flow rate

IC = corrected chart response

I = actual chart response

m = calibrator Qstd slope

b = calibrator Qstd intercept

Ta = actual temperature during calibration (deg K)

Pa = actual pressure during calibration (mm Hg)

Tstd = 298 deg K

Pstd = 760 mm Hg

For subsequent calculation of sampler flow:

$1/m((I) [\text{Sqrt}(298/\text{Tav})(\text{Pav}/760)] - b)$

m = sampler slope

b = sampler intercept

I = chart response

Tav = daily average temperature

Pav = daily average pressure

FLOW RATE CHART

Standard Flow Rate (m³/min)	Actual Chart Response (IC)
0.820	26.98
1.038	31.98
1.298	40.97
1.475	46.97
1.647	52.97

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Project Consultant

Report Date: 7th April, 2017

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MaterialLab**TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET**

Project : Environmental Monitoring Works For Contract No. KLN/2015/07
Location : KTD2a
Brand: Tisch
Model: TE-5170 S/N: 3838
Date of Calibration: 10-Jan-17
Next Calibration Date: 7-Apr-17
Technician: Jimmy Lui

CONDITIONS

Sea Level Pressure (hPa): 1018.1 Corrected Pressure (mm Hg): 764
Temperature (°C): 19 Temperature (K): 292

CALIBRATION ORIFICE

Make: Tisch Qstd Slope: 2.07173
Model: TE-5025A Qstd Intercept: -0.01761
Calibration Date: 14-Jan-16 Expiry Date: 14-Jan-17
S/N: 2456

CALIBRATIONS

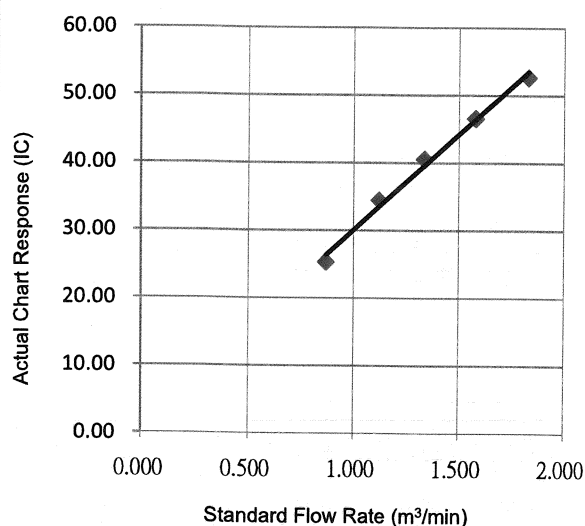
Plate No.	H2O (L) (in)	H2O (R) (in)	H2O (in)	Qstd (m ³ /min)	I (chart)	IC (corrected)	LINEAR REGRESSION
18	0.80	-13.00	13.800	1.825	52.00	52.67	Slope = 28.2743 Intercept = 1.8309 Corr. coeff.: 0.9964
13	-0.80	-11.10	10.300	1.578	46.00	46.59	
10	-2.30	-9.70	7.400	1.338	40.00	40.52	
7	-3.30	-8.50	5.200	1.123	34.00	34.44	
5	-4.40	-7.50	3.100	0.869	25.00	25.32	

Calculations:

Qstd = $1/m[\text{Sqrt}(\text{H}_2\text{O}(\text{Pa}/\text{Pstd})(\text{Tstd}/\text{Ta})) - b]$
IC = $I[\text{Sqrt}(\text{Pa}/\text{Pstd})(\text{Tstd}/\text{Ta})]$
Qstd = standard flow rate
IC = corrected chart response
I = actual chart response
m = calibrator Qstd slope
b = calibrator Qstd intercept
Ta = actual temperature during calibration (deg K)
Pa = actual pressure during calibration (mm Hg)
Tstd = 298 deg K
Pstd = 760 mm Hg

For subsequent calculation of sampler flow:

$1/m([I][\text{Sqrt}(298/\text{Tav})(\text{Pav}/760)] - b)$
m = sampler slope
b = sampler intercept
I = chart response
Tav = daily average temperature
Pav = daily average pressure

FLOW RATE CHART

CHOI KAM HO
Project Consultant

Report Date: 10th January, 2017

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MaterialLab**TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET**

Project : Environmental Monitoring Works For Contract No. KLN/2015/07
Location : KTD2a
Brand: Tisch
Model: TE-5170 S/N: 3838
Date of Calibration: 7-Apr-17
Next Calibration Date: 6-Jul-17
Technician: Jimmy Lui

CONDITIONS

Sea Level Pressure (hPa): 1012.4 Corrected Pressure (mm Hg): 759
Temperature (°C): 25 Temperature (K): 298

CALIBRATION ORIFICE

Make: Tisch Qstd Slope: 2.12779
Model: TE-5025A Qstd Intercept: -0.04273
Calibration Date: 18-Jan-17 Expiry Date: 18-Jan-18
S/N: 2154

CALIBRATIONS

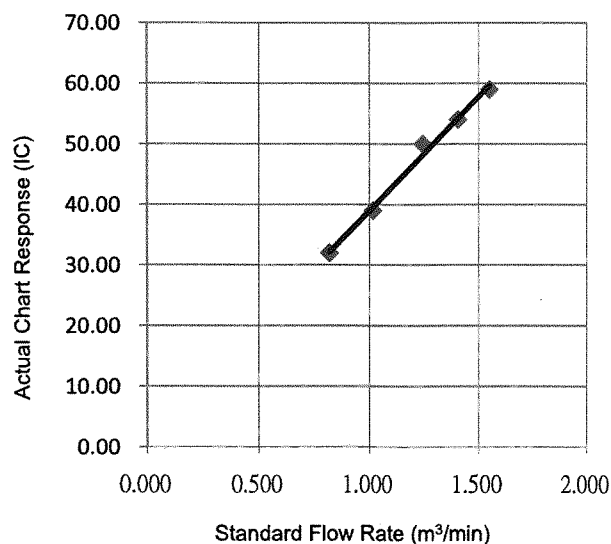
Plate No.	H2O (L) (in)	H2O (R) (in)	H2O (in)	Qstd (m ³ /min)	I (chart)	IC (corrected)	LINEAR REGRESSION
18	4.90	-5.70	10.600	1.549	59.00	58.96	Slope = 37.5842 Intercept = 1.4001 Corr. coeff.: 0.9958
13	4.00	-4.70	8.700	1.405	54.00	53.96	
10	3.00	-3.80	6.800	1.245	50.00	49.97	
7	1.90	-2.60	4.500	1.016	39.00	38.97	
5	1.10	-1.80	2.900	0.820	32.00	31.98	

Calculations:

Qstd = $1/m[\text{Sqrt}(\text{H2O}(\text{Pa}/\text{Pstd})(\text{Tstd}/\text{Ta})) - b]$
IC = $I[\text{Sqrt}(\text{Pa}/\text{Pstd})(\text{Tstd}/\text{Ta})]$
Qstd = standard flow rate
IC = corrected chart response
I = actual chart response
m = calibrator Qstd slope
b = calibrator Qstd intercept
Ta = actual temperature during calibration (deg K)
Pa = actual pressure during calibration (mm Hg)
Tstd = 298 deg K
Pstd = 760 mm Hg

For subsequent calculation of sampler flow:

$1/m((I[\text{Sqrt}(298/\text{Tav})(\text{Pav}/760)] - b)$
m = sampler slope
b = sampler intercept
I = chart response
Tav = daily average temperature
Pav = daily average pressure

FLOW RATE CHART

CHOI KAM HO
Project Consultant

Report Date: 7th April, 2017

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Materialab

Report No. : 161966CA161195

Page 1 of 1

CALIBRATION CERTIFICATE OF ANEMOMETER

Client Supplied Information

Client : Materialab Consultants Ltd.

Address : Room 723 & 725, 7/F., Block B Profit Industrial Building, 1-15 Kwai Fung Crescent, Kwai Chung, N.T.

Project : Calibration Services

Details of Unit Under Test, UUT

Description : Anemometer

Manufacturer : Smart Sensor

Model No. : AR816+

Equipment ID.: MC-A-001

Next Calibration Date : 05-Jun-2017

Laboratory Information

Details of Reference Equipment –

Description : Reference Anemometer

Equipment ID.: R-101-4

Date of Calibration : 06-Jun-2016 Ambient Temperature : 21 °C

Calibration Location : Calibration Laboratory of Materialab

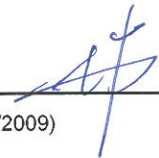

Method Used : By direct Comparison

Calibration Results :

Reference Reading (m/s)	UUT Reading (m/s)	Error (m/s)
0.00	0.0	0.00
0.99	1.0	+0.01
2.02	2.0	-0.02
5.00	5.0	0.00
9.98	9.9	-0.08

Remarks :

1. The equipment being used in this calibration is traceable to recognized National Standards.

Checked by :  Date : 7-6-2016 Certified by :  Date : 7-6-2016
CA-R-297 (22/07/2009) Chan Chun Wai (Manager)

**** End of Report ****

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Materialab

Report no.: 161966CA161737

Page 1 of 1

CALIBRATION CERTIFICATE OF SOUND LEVEL METER

Client : Materialab Consultants Ltd.

Project : Calibration Services

Client Supplied Information

Details of Unit Under Test, UUT

Description : Sound Level Meter
Manufacturer : Casella (Model no. CEL-63X(meter), CEL-251(microphone), CEL-495(Preamplifier))
Serial No. : 2451083 (meter), 01361(microphone), 002845 (Preamplifier))
Next Calibration Date : 23-Aug-2017
Specification Limit : EN 61672: 2003 Type 1

Laboratory Information

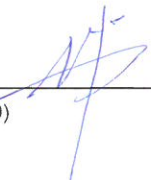
Description : B & K Acoustic Multifunction Calibrator 4226 (Traditional free field setting)
Equipment ID. : R-108-1
Date of Calibration : 24-Aug-2016 Ambient Temperature : 21 °C
Calibration Location : Calibration Laboratory of Materialab
Method Used : By direct comparison

Calibration Results :


Parameters		Mean Value (dB)	Specification Limit(dB)
A-weighting frequency response	4000Hz	0.6	2.6 to -0.6
	2000Hz	0.5	2.8 to -0.4
	1000Hz	0.0	1.1 to -1.1
	500Hz	-3.0	-1.8 to -4.6
	250Hz	-8.3	-7.2 to -10.0
	125Hz	-15.7	-14.6 to -17.6
	63Hz	-25.7	-24.7 to -27.7
	31.5Hz	-37.4	-37.4 to -41.4
Differential level linearity	94dB-104dB	0.0	± 0.6
	104dB-114dB	0.0	± 0.6

Remarks :

1. The equipment used in this calibration is traceable to recognized National Standards.
2. The mean value is the average of four measurements.
3. For calibration: Reference SPL are 94, 104 & 114dB, range setting is 20-140dB & time weighing is fast
4. The equipment does comply with EN 61672: 2003 Type 1 sound level meter for the above measurement.

Checked by : 
CA-R-297 (22/07/2009)

Date : 24.8.2016

Certified by : 
Chan Chun Wai (Manager) /

Kwok Chi Wa (Assistant Manager)

Date : 26.8.2016

**** End of Report ****

FUGRO TECHNICAL SERVICES LIMITED

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MaterialLab

Report no.: 161966CA162338

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CALIBRATION CERTIFICATE OF SOUND LEVEL METER**Client Supplied Information**

Client : MaterialLab Consultants Ltd.

Address : Room 723 & 725, 7/F., Block B Profit Industrial Building, 1-15 Kwai Fung Crescent, Kwai Chung, N.T.

Project : Calibration Services

Details of Unit Under Test, UUT

Description : Sound Level Meter
Manufacturer : Casella
Model No. : Casella (Model no. CEL-63X(meter), CEL-251(microphone), CEL-495(Preamplifier))
Serial No. : 2451028 (meter), 01231(microphone), 002850 (Preamplifier))
Next Calibration Date : 16-Nov-2017
Specification Limit : EN 61672: 2003 Type 1

Laboratory Information

Description : B & K Acoustic Multifunction Calibrator 4226 (Traditional free field setting)

Equipment ID. : R-108-1

Date of Calibration : 17-Nov-2016 Ambient Temperature : 22 °C

Calibration Location : Calibration Laboratory of MaterialLab

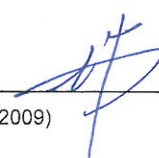

Method Used : By direct comparison

Calibration Results :

Parameters		Mean Value (dB)	Specification Limit(dB)
A-weighting frequency response	4000Hz	2.6	2.6 to -0.6
	2000Hz	0.8	2.8 to -0.4
	1000Hz	-1.0	1.1 to -1.1
	500Hz	-4.5	-1.8 to -4.6
	250Hz	-9.9	-7.2 to -10.0
	125Hz	-17.3	-14.6 to -17.6
	63Hz	-27.3	-24.7 to -27.7
	31.5Hz	-39.5	-37.4 to -41.4
Differential level linearity	94dB-104dB	0.0	± 0.6
	104dB-114dB	0.0	± 0.6

Remarks :

1. The equipment used in this calibration is traceable to recognized National Standards.
2. The mean value is the average of four measurements.
3. For calibration: Reference SPL are 94, 104 & 114dB, range setting is 20-140dB & time weighing is fast
4. The equipment does comply with EN 61672: 2003 Type 1 sound level meter for the above measurement.

Checked by :  Date : 22/11/2016 Certified by :  Date : 23/11/2016
CA-R-297 (22/07/2009) Chan Chun Wai (Manager)

**** End of Report ****

Certificate of Conformity and Calibration

Instrument Model:- CEL-633A

Serial Number 3756072
Firmware revision V129-09

Microphone Type:- CEL-251
Serial Number 1361

Preamplifier Type:- CEL-495
Serial Number 003527

Instrument Class/Type:- 1

Applicable standards:-

IEC 61672: 2002 / EN 60651 (Electroacoustics - Sound Level Meters)
IEC 60651 1979 (Sound Level Meters), ANSI S1.4: 1983 (Specifications For Sound Level Meters)

Note:- The test sequences performed in this report are in accordance with the current Sound level meter Standard - IEC61672. The combination of tests performed are considered to confirm the products electro-acoustic performance to all applicable standards including superceeded Sound Level Meter Standards - IEC60651 and IEC60804.

Test Conditions:- 25 °C
52 %RH
1010 mBar

Test Engineer:- Millie Duncan
Date of Issue:- May 13, 2016



Declaration of conformity:-

This test certificate confirms that the instrument specified above has been successfully tested to comply with the manufacturer's published specifications. Tests are performed using equipment traceable to national standards in accordance with Casella's ISO 9001:2008 quality procedures. This product is certified as being compliant to the requirements of the CE Directive.

Test Summary:-

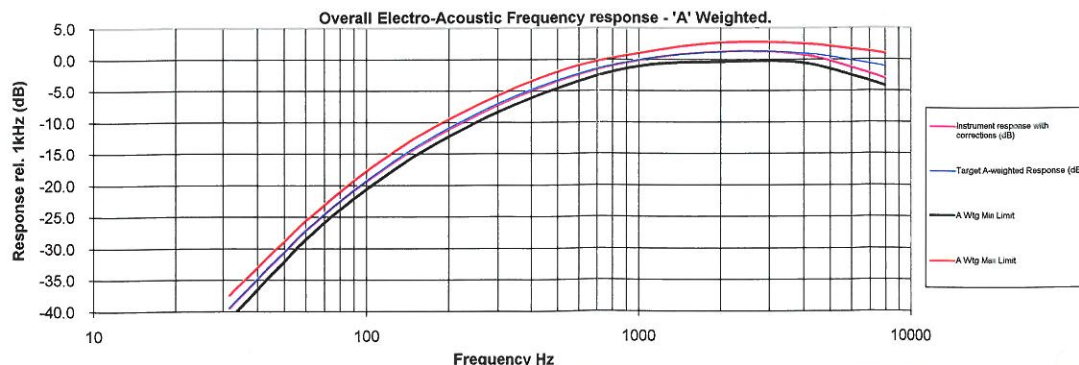
Self Generated Noise Test
Electrical Signal Test Of Frequency Weightings
Frequency & Time Weightings At 1 kHz
Level Linearity On The Reference Level Range
Toneburst Response Test
C-peak Sound Levels
Overload Indication
Acoustic Tests

All Tests Pass
All Tests Pass
All Tests Pass
All Tests Pass
All Tests Pass
All Tests Pass
All Tests Pass
All Tests Pass

Combined Electro-Acoustic Frequency Response - A Weighted

Combined Electro-Acoustic Frequency Response - A Weighted (IEC 61672-3:2006)

The following A-Weighted frequency response graph shows this instruments overall frequency response based upon the application of multi-frequency pressure field calibrations. The microphones Pressure to Free field correction coefficients are applied to pressure response. Reference level taken at 1kHz.



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Materialab

Report no.: 161966CA161645

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CALIBRATION CERTIFICATE OF SOUND CALIBRATOR

Client : Materialab Consultants Ltd.

Address : Room 723 & 725, 7F., Block B Profit Industrial Building, 1-15 Kwai Fung Crescent, Kwai Chung, N.T.

Project : Calibration Services

Client Supplied Information

Details of Unit Under Test, UUT

Description : Sound calibrator
Manufacturer : Casella (Model no. CEL-120/1)
Serial No. : 5230950
Next Calibration Date : 09-Aug-2017
Specification Limit : $\pm 0.5\text{dB}$

Laboratory Information

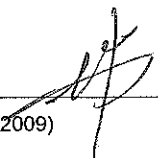
Description : 1. Reference sound level meter 2. Multifunction acoustic calibrator
Equipment ID. : 1. R-119-1 2. R-108-1
Date of Calibration : 10-Aug-2016 Ambient Temperature : 21 °C
Calibration Location : Calibration Laboratory of Materialab
Method Used : By direct comparison

Calibration Results :

Parameters (Setting of UUT)	Mean of measured value	Specification limit
94dB	93.8 dB	$\pm 0.5\text{dB}$
114dB	114.0 dB	

Remarks :

1. The equipment used in this calibration is traceable to recognized National Standards.
2. The mean value is the average of four measurements.
3. The equipment does comply with the specification limit.

Checked by : 
CA-R-297 (22/07/2009)

Date : 12-8-2016

Certified by :


Kwok Chi Wa (Assistant Manager)

Date :

16 AUG 2016

**** End of Report ****

**Certificate of
Conformance and Calibration for**

CEL-120 Acoustic Calibrator

Applicable Standards :- IEC 60942: 2003 & ANSI S1.40: 2006

CEL-120/1 Class 1 ☒

CEL-120/2 Class 2 ☐

Serial No: 4358251

Firmware: 03

Temperature: 22.0 °C Pressure: 999.5 mb %RH 55.0

Frequency = 1.00kHz \pm 2Hz T.H.D. = < 1%	Calibration Level
SPL @ 114.0dB Setting	<u>113.99</u> dB
SPL @ 94.0dB Setting (CEL-120/1 only)	<u>93.93</u> dB/N.A

Engineer :- M. Duncu Date :- 12 MAY 2016

Company test equipment and acoustic working standards, used for conformance testing, are subject to periodic calibration, traceable to UK national standards, in accordance with the company's ISO9001 Quality System.

DECLARATION OF CONFORMITY

This certificate confirms that the instrument specified above has been produced and tested to comply with the manufacturer's published specifications and the relevant European Community CE directives.

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Report no.: 161966CA162202(1)

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CALIBRATION CERTIFICATE OF SOUND CALIBRATOR**Client Supplied Information**

Client : Materialab Consultants Ltd.

Address : Room 723 & 725, 7/F., Block B Profit Industrial Building, 1-15 Kwai Fung Crescent, Kwai Chung, N.T.

Project : Calibration Services

Details of Unit Under Test, UUT

Description : Sound Calibrator
Manufacturer : Casella (Model no. CEL-120/1)
Serial No. : 3321858
Next Calibration Date : 31-Oct-2017
Specification Limit : ± 0.5 dB

Laboratory Information


Description : Reference Sound level meter
Equipment ID. : R-119-1
Date of Calibration : 01-Nov-2016 Ambient Temperature : 22 °C
Calibration Location : Calibration Laboratory of Materialab
Method Used : By direct comparison

Calibration Results :

Parameters (Setting of UUT)	Mean Value (error of measurement)	Specification Limit(dB)
94dB	-0.3 dB	± 0.5 dB
114dB	-0.2 dB	

Remarks :

1. The equipment used in this calibration is traceable to recognized National Standards.
2. The mean value is the average of four measurements.
3. The equipment does comply with the specification limit.

Checked by : 
CA-R-297 (22/07/2009)

Date : 3-11-2016

Certified by : 

Date : 4-11-2016

Chan Chun Wai (Manager)

** End of Report **