

RECALIBRATION **DUE DATE:** 

October 20, 2022

Certificate of Calibration

					on Informat	· ·		
Cal. Date:	October 20	), 2021	Roots	meter S/N:	: 438320 Ta: 295		295	°К
Operator:	Jim Tisch					Pa:	753.9	mm Hg
<b>Calibration</b>	Model #:	TE-5025A	Calil	orator S/N:	3543			
		No.1 Justa	Mal Pinal		A 771			1
	Run	Vol. Init (m3)	Vol. Final (m3)	ΔVol. (m3)	ΔTime (min)	ΔP (mm Ha)	ΔH (i= 1120)	
	1	<u>(ms)</u>	2	1		(mm Hg) 3.2	(in H2O) 2.00	
	2	3	4	1	1.0060	6.4	4.00	
	3	5	6	1	0.8990	7.9	5.00	
	4	7	8	1	0.8550	8.8	5.50	
	5	9	10	1	0.7050	12.8	8.00	
			<u> </u>	Data Tabula	tion			1
				V Tetal			[	
	Vstd	Qstd	$\sqrt{\Delta H \left( \frac{Pa}{Pstd} \right)}$	<u>)(Tstd</u> ) Ta		Qa	√∆H( Ta/Pa )	
	(m3)	(x-axis)	(y-ax	is)	Va	(x-axis)	(y-axis)	
	0.9978	0.6977	1.41		0.9958	0.6963	0.8847	
	0.9935	0.9876	2.002	20	0.9915	0.9856	1.2511	
	0.9915	1.1029	2.238		0.9895	1.1007	1.3988	
	0.9903	1.1583	2.34		0.9883	1.1559	1.4670	
	0.9850	1.3972	2.83		0.9830	1.3944	1.7693	
	QSTD	b=	2.024			<u>m=</u> b=	1.26761 0.00217	
	QJID	r=	1.000		QA	r=	1.00000	
		·····		Calculatio				
	Vstd=	ΔVol((Pa-ΔP)	/Pstd)(Tstd/Ta				P)/Pa)	
		Vstd/∆Time	// 500/(1500/ /2			ΔVol((Pa-ΔP)/Pa) Va/ΔTime		
			For subsequ	ent flow ra	ent flow rate calculations:			
	Qstd=	1/m (( \\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \	Pa <u>Tstd</u> Pstd Ta	))-b)	Qa=			
	Standard	Conditions						
						RECA	IBRATION	
Tstd:	298.15							
Tstd: Pstd:	760	mm Hg			US EPA reco	mmonds a	nual recalibratio	n nor 100
Pstd:	760 K	mm Hg Cey	n H2O)				nual recalibratio	-
Pstd: AH: calibrate	760 K pr manomet	mm Hg C <b>ey</b> er reading (ii			40 Code	of Federal F	egulations Part 5	50 to 51,
Pstd: ΔH: calibrato ΔP: rootsme	760 K or manomet ter manome	mm Hg Cey			40 Code Appendix E	of Federal <del>F</del> 8 to Part 50,	egulations Part 5 Reference Meth	50 to 51, od for the
Pstd: ΔΗ: calibrato ΔΡ: rootsme Γa: actual ab	760 K or manomet ter manome solute temp	mm Hg er reading (ii eter reading (	(mm Hg)		40 Code Appendix E Determinat	of Federal <del>F</del> 8 to Part 50, ion of Susp	egulations Part 5	50 to 51, od for the Matter in

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$\begin{array}{c c} \hline & & & & & & & & & & & & & & & & & & $				Site I	nformation		
Barometric Pressure (in Hg): 29.69Corrected Pressure (mm Hg): 754 Temperature (deg K): 299 Average Press. (in Hg): 29.69 Average Temp. (deg F): 79Corrected Average (mm Hg): 754 Temperature (deg K): 299Calibration OrificeCalibration OrificeMake: Tisch Model: TE-5025A Serial#: 3543Qstd Slope: 2.02434 Qstd Slope: 2.02434 Qstd Slope: 2.02434 Model: TE-5025A Serial#: 3543Calibration OrificeCalibration InformationPlate or H2O Test # (in) (m3/min) (chart) (chart)Corrected) Linear Regression112.401.72853.052.70Slope: 30.7807210.501.59048.047.73Intercept: -0.824137.801.37041.040.77Corr. Coeff: 0.997744.601.05233.032.8155CalculationsMay appendent of the sponseQstd = 1/m[Sqrt(H2O(Pa/Pstd)(Tstd/Ta))-b]m = sampler slopeDe sampler interceptI= chart responseI= chart responseI= atual chart responsem= calibrator Qstd SlopeA4.0A4.0A4.0A4.0A4.0B= sampler slopeIC = corrected chart responseII = actual chart responseII = actual chart responseII = actual chart response<					Kowloon Cu		
Temperature (deg F): 79Temperature (deg K): 299Average Press. (in Hg): 29,69Corrected Average (mm Hg): 754Average Temp. (deg F): 79Average Temp. (deg K): 299Calibration OrificeCalibration OrificeMake: TischQstd Slope: 2.02434Model: TE-5025AQstd Intercept: 0.00347Serial#: 3543Date Certified: 20-Oct-21Calibration InformationPlate orH2OQstdIIICTest #(in)(m3/min)(chart)112.401.72853.052.70210.501.59048.047.7337.801.37041.040.7744.601.05233.032.8152.600.79023.022.87# of Observations: 5CalculationsQstd = 1/m[Sqrt(H2O(Pa/Pstd)(Tstd/Ta))-b]m = sampler slopeC = corrected chart responsem = sampler interceptI = actual chart responseTav = daily average pressureI = actual chart responseTav = daily average pressureI = actual chart responseFav = daily average pressureI = actual chart responseAverage I (chart): 40				Site C	Conditions		
Make: Ti sch Model: TE-5025A Serial#: $3543$ Qstd Slope: $2.02434$ Qstd Intercept: $0.00347$ Date Certified: $20-Oct-21$ Calibration InformationPlate orH2O (m3/min)QstdI (chart)IC (corrected)112.401.728 $53.0$ $52.70$ Slope: $30.7807$ 210.501.590 $48.0$ $47.73$ Intercept: $-0.8241$ 37.801.370 $41.0$ $40.77$ Corr. Coeff: $0.9977$ 4 $4.60$ 1.052 $33.0$ $32.81$ $5$ CalculationsQstd = 1/m[Sqrt(H2O(Pa/Pstd)(Tstd/Ta))-b]IC = I[Sqrt(Pa/Pstd)(Tstd/Ta)]m = sampler slope b = sampler intercept I = chart responseQstd = standard flow rate IC = corrected chart response I = actual chart response m = calibrator Qstd slopem = calibrator Qstd slopeAverage I (chart): $40$		Temperature (deg F): 79 Average Press. (in Hg): 29.69				Temp Corrected Ave	erature (deg K): 299 erage (mm Hg): 754
Model:TE-5025A Serial#:Qstd Intercept: $0.00347$ Date Certified: $20-\text{Oct}-21$ Calibration InformationPlate orH2OQstdIICTest #(in)(m3/min)(chart)(corrected)Linear Regression112.401.72853.052.70Slope:30.7807210.501.59048.047.73Intercept: $-0.8241$ 37.801.37041.040.77Corr. Coeff: $0.9977$ 44.601.05233.032.815 $5$ $5$ CalculationsQstd = 1/m[Sqrt(H2O(Pa/Pstd)(Tstd/Ta))-b]IC = I[Sqrt(Pa/Pstd)(Tstd/Ta)]m = sampler slope b = sampler intercept I = chart responseQstd = standard flow rate IC = corrected chart response I = actual chart response I = actual chart response m = calibrator Qstd slopeM erage I (chart): 40				Calibra	tion Orifice		
Plate or         H2O         Qstd         I         IC           Test #         (in)         (m3/min)         (chart)         (corrected)         Linear Regression           1         12.40         1.728         53.0         52.70         Slope: 30.7807           2         10.50         1.590         48.0         47.73         Intercept: -0.8241           3         7.80         1.370         41.0         40.77         Corr. Coeff: 0.9977           4         4.60         1.052         33.0         32.81		Model: TE-5025A				Qstd Intercept:	0.00347
Test #       (in)       (m3/min)       (chart)       (corrected)       Linear Regression         1       12.40       1.728 $53.0$ $52.70$ Slope: $30.7807$ 2       10.50       1.590 $48.0$ $47.73$ Intercept: $-0.8241$ 3       7.80       1.370 $41.0$ $40.77$ Corr. Coeff: $0.9977$ 4       4.60       1.052 $33.0$ $32.81$ $977$ 5       2.60 $0.790$ $23.0$ $22.87$ # of Observations: $5$ Calculations         Qstd = 1/m[Sqrt(H2O(Pa/Pstd)(Tstd/Ta))-b]       m = sampler slope $b$ = sampler intercept         IC = I[Sqrt(Pa/Pstd)(Tstd/Ta)] $B$ = sampler intercept       I = chart response         Qstd = standard flow rate       Tav = daily average temperature       Pav = daily average pressure         I = actual chart response       Pav = daily average pressure       Pav = daily average pressure         I = actual chart response       M = calibrator Qstd slope       Average I (chart): $40$				Calibratio	on Informatic	n	
Qstd = 1/m[Sqrt(H2O(Pa/Pstd)(Tstd/Ta))-b]m = sampler slopeIC = I[Sqrt(Pa/Pstd)(Tstd/Ta)]b = sampler interceptI = chart responseI = chart responseQstd = standard flow rateTav = daily average temperatureIC = corrected chart responsePav = daily average pressureI = actual chart responsePav = daily average pressurem = calibrator Qstd slopeAverage I (chart): 40	Test # 1 2 3 4	(in) 12.40 10.50 7.80 4.60	(m3/min) 1.728 1.590 1.370 1.052	(chart) 53.0 48.0 41.0 33.0	(corrected) 52.70 47.73 40.77 32.81	# (	Slope: 30.7807 Intercept: -0.8241 Corr. Coeff: 0.9977
IC = I[Sqrt(Pa/Pstd)(Tstd/Ta)]       b = sampler intercept         I = chart response       I = chart response         Qstd = standard flow rate       Tav = daily average temperature         IC = corrected chart response       Pav = daily average pressure         I = actual chart response       Pav = daily average pressure         m = calibrator Qstd slope       Average I (chart): 40				Ca	alculations		
	IC = I[Sqrt(Pa/Pst Qstd = standard fl IC = corrected cha	td)(Tstd/Ta)] low rate art response	td/Ta))-b]			b = sampler inte I = chart respon Tav = daily avera	ercept ise age temperature
Ta = actual temperature during calibration (deg K)1.305956055Pa = actual pressure during calibration (mm Hg)Average Flow Calculation in CFMTstd = 298 deg K46.1133083Pstd = 760 mm HgSample Time (Hrs): 1.0For subsequent calculation of sampler flow:Total Flow in m3/min1/m((I)[Sqrt(298/Tav)(Pav/760)]-b)78.3573633Total Flow in CFM2766.798498	m = calibrator Qs b = calibrator Qs Ta = actual tempe Pa = actual pressu Tstd = 298 deg K Pstd = 760 mm H. For subsequent ca	std slope td intercept erature during cal ure during calibra g lculation of sam	ation (mm Hg) pler flow:			Averag Averag Sam	ge Flow Calculation m3/min 1.305956055 ge Flow Calculation in CFM 46.1133083 uple Time (Hrs): 1.0 Total Flow in m3/min 78.3573633 Total Flow in CFM



Location: A Sampler:	AM3A TE-5170			nformation Zones 2A a Kowloon Cu 4340		Date: 6-Aug-22 Tech: CS Tang	
				Conditions			
	Barometric Pre	essure (in Hg): 2		conditions	Corrected Press	sure (mm Hg): 756	
	Tempe	erature (deg F): 8	2		Temper	rature (deg K): 301	
	Average	Press. (in Hg): 2	9.75		Corrected Aver	<b>age (mm Hg):</b> 756	
	Average	Temp. (deg F): 8	2		Average T	<b>Cemp. (deg K):</b> 301	
			Calibra	tion Orifice			
	Make:				Qstd Slope: 2		
		TE-5025A			Qstd Intercept: 0		
	Serial#:	3543			Date Certified: 2	0-0ct-21	
			Calibratic	n Informatic	n		
Plate or	H2O	Qstd	I	IC			
Test #	(in)	(m3/min)	(chart)	(corrected)		Linear Regression	
1	12.50	1.731	53.0	52.59		Slope: 31.2731	
2 3	10.40	1.579	48.0	47.63		Intercept: -1.6802 Corr. Coeff: 0.9978	
3	7.90 4.70	1.376 1.061	41.0 33.0	40.69 32.75		Con. Coell: 0.9978	
4 5	4.70	0.804	23.0	22.82	# of	of Observations: 5	
				alculations			
			- Ca	acmanons			
- 1/m[Sart(	U)O(Do/Dotd)(To	$td(T_0)$ bl		ioululolib	m – compler den		
	H2O(Pa/Pstd)(Ts td)(Tstd/Ta)]	std/Ta))-b]		iouiuioiis	m = sampler slop		
	H2O(Pa/Pstd)(Ts std)(Tstd/Ta)]	std/Ta))-b]			b = sampler inter	cept	
I[Sqrt(Pa/Ps	std)(Tstd/Ta)]	std/Ta))-b]		ioulutons	b = sampler inter I = chart response	cept e	
I[Sqrt(Pa/Ps = standard f	std)(Tstd/Ta)] flow rate	std/Ta))-b]			<ul><li>b = sampler inter</li><li>I = chart response</li><li>Tav = daily average</li></ul>	cept e ge temperature	
I[Sqrt(Pa/Ps = standard f	std)(Tstd/Ta)] flow rate nart response	std/Ta))-b]			b = sampler inter I = chart response	cept e ge temperature	
I[Sqrt(Pa/Ps = standard f corrected ch ctual chart re	std)(Tstd/Ta)] flow rate nart response esponse	std/Ta))-b]			<ul> <li>b = sampler inter</li> <li>I = chart response</li> <li>Tav = daily averag</li> <li>Pav = daily averag</li> </ul>	cept e ge temperature ge pressure	
I[Sqrt(Pa/Ps = standard f corrected ch ctual chart re calibrator Q	std)(Tstd/Ta)] flow rate nart response esponse 9std slope	std/Ta))-b]			<ul> <li>b = sampler inter</li> <li>I = chart response</li> <li>Tav = daily averag</li> <li>Pav = daily averag</li> </ul>	cept e te temperature re pressure erage I (chart): 40	
I[Sqrt(Pa/Ps = standard f corrected ch ctual chart re calibrator Q calibrator Qs	std)(Tstd/Ta)] flow rate nart response esponse 9std slope				<ul> <li>b = sampler inter</li> <li>I = chart response</li> <li>Tav = daily averag</li> <li>Pav = daily averag</li> </ul>	cept e ge temperature ge pressure	
I[Sqrt(Pa/Ps = standard f corrected ch ctual chart re calibrator Q calibrator Qs actual tempo	std)(Tstd/Ta)] flow rate hart response esponse lystd slope std intercept	libration (deg K)			b = sampler inter I = chart response Tav = daily averag Pav = daily averag Average	cept e ge temperature re pressure erage I (chart): 40 e Flow Calculation m3/min	
I[Sqrt(Pa/Ps = standard f corrected ch ctual chart re calibrator Q calibrator Qs actual tempo	std)(Tstd/Ta)] flow rate nart response esponse 2std slope std intercept erature during cal ure during calibra	libration (deg K)			b = sampler inter I = chart response Tav = daily averag Pav = daily averag Average	cept e ge temperature re pressure erage I (chart): 40 e Flow Calculation m3/min 1.310262681	
I[Sqrt(Pa/Ps = standard f corrected ch ctual chart re calibrator Qs actual tempo actual presss = 298 deg K = 760 mm H	std)(Tstd/Ta)] flow rate nart response esponse estd slope std intercept erature during cal ure during calibra	libration (deg K) ation (mm Hg)			b = sampler inter I = chart response Tav = daily averag Pav = daily average Average Average	cept e e temperature re pressure erage I (chart): 40 e Flow Calculation m3/min 1.310262681 e Flow Calculation in CFM	
I[Sqrt(Pa/Ps = standard f corrected ch ctual chart re calibrator Qs actual tempo actual presss = 298 deg K = 760 mm H	std)(Tstd/Ta)] flow rate nart response esponse estd slope std intercept erature during cal ure during calibra	libration (deg K) ation (mm Hg)			<ul> <li>b = sampler inter</li> <li>I = chart response</li> <li>Tav = daily average</li> <li>Pav = daily average</li> <li>Average</li> <li>Average</li> <li>Samp</li> </ul>	cept e ge temperature ge pressure erage I (chart): 40 e Flow Calculation m3/min 1.310262681 e Flow Calculation in CFM 46.26537527 le Time (Hrs): 1.0 otal Flow in m3/min	
I[Sqrt(Pa/Ps = standard f corrected ch ctual chart re calibrator Q calibrator Qs actual tempo actual press = 298 deg K = 760 mm H subsequent ca	std)(Tstd/Ta)] flow rate nart response esponse estd slope std intercept erature during cal ure during calibra	libration (deg K) ation (mm Hg) pler flow:			<ul> <li>b = sampler inter</li> <li>I = chart response</li> <li>Tav = daily average</li> <li>Pav = daily average</li> <li>Average</li> <li>Average</li> <li>Samp</li> <li>T</li> </ul>	cept e ge temperature ge pressure erage I (chart): 40 e Flow Calculation m3/min 1.310262681 e Flow Calculation in CFM 46.26537527 le Time (Hrs): 1.0 otal Flow in m3/min 78.61576087	
I[Sqrt(Pa/Ps = standard f corrected ch ctual chart re calibrator Q calibrator Qs actual tempo actual press = 298 deg K = 760 mm H subsequent ca	std)(Tstd/Ta)] flow rate nart response esponse 2std slope std intercept erature during cal ure during calibra C Ig alculation of sam	libration (deg K) ation (mm Hg) pler flow:			<ul> <li>b = sampler inter</li> <li>I = chart response</li> <li>Tav = daily average</li> <li>Pav = daily average</li> <li>Average</li> <li>Average</li> <li>Samp</li> <li>T</li> </ul>	cept e e temperature e pressure erage I (chart): 40 e Flow Calculation m3/min 1.310262681 e Flow Calculation in CFM 46.26537527 le Time (Hrs): 1.0 otal Flow in m3/min	



			Site Iı	nformation		
Location: 4				Zones 2A a Kowloon Cu		Date: 10-Jun-22
			Site ID. Serial No:		ilculai	Tech: CS Tang
Sampler: TE-5170			Sellal INO:	5550		Tech. Co Tung
				Conditions		
Barometric Pressure (in Hg): 29.69						sure (mm Hg): 754
	-	erature (deg F): 7			-	ature (deg K): 299
		Press. (in Hg): 2				age (mm Hg): 754
	Average '	Temp. (deg F): 7	9		Average T	emp. (deg K): 299
			Calibra	tion Orifice		
	Make:				Qstd Slope: 2	
		TE-5025A			Qstd Intercept: 0	
	Serial#:	3543			Date Certified: 2	0-Oct-21
			Calibratic	n Informatic	n	
Plate or	H2O	Qstd	Ι	IC		
Test #	(in)	(m3/min)	(chart)	(corrected)		Linear Regression
1	12.50	1.735	53.0	52.70		Slope: 29.5963
2	10.80	1.612	48.0	47.73		Intercept: 0.8281
3	7.70	1.361	41.0	40.77		Corr. Coeff: 0.9962
4	4.40	1.029	33.0	32.81		
5	2.50	0.775	23.0	22.87	# OI	Observations: 5
			Ca	alculations		
	H2O(Pa/Pstd)(Ts	std/Ta))-b]			m = sampler slop	
= I[Sqrt(Pa/Pst	td)(Tstd/Ta)]				b = sampler inter	
					I = chart response	
Qstd = standard flow rate					Tav = daily averag	
	art response				Pav = daily averag	e pressure
= corrected cha						
= corrected cha actual chart re	-					
= corrected cha actual chart re = calibrator Qa	std slope					erage I (chart): 40
= corrected cha actual chart re = calibrator Qs = calibrator Qs	std slope td intercept					Flow Calculation m3/min
= corrected cha actual chart re = calibrator Qs = calibrator Qs = actual tempe	std slope td intercept erature during ca	libration (deg K)			Average	Flow Calculation m3/min 1.302392012
= corrected char actual chart re = calibrator Qs = calibrator Qs = actual tempe = actual pressu	std slope td intercept erature during ca ure during calibra				Average Average	Flow Calculation m3/min 1.302392012 Flow Calculation in CFM
= corrected char actual chart re = calibrator Qs = calibrator Qs = actual tempe = actual pressu td = 298 deg K	std slope td intercept erature during ca are during calibra				Average Average	<ul> <li>Flow Calculation m3/min 1.302392012</li> <li>Flow Calculation in CFM 45.98746193</li> </ul>
= corrected cha = actual chart re = calibrator Qs = actual tempe = actual pressu td = 298 deg K td = 760 mm H	std slope td intercept erature during ca ure during calibra	ation (mm Hg)			Average Average Samp	<ul> <li>Flow Calculation m3/min         <ol> <li>1.302392012</li> <li>Flow Calculation in CFM</li></ol></li></ul>
= corrected cha actual chart re = calibrator Qs = calibrator Qs = actual tempe = actual pressu td = 298 deg K td = 760 mm H r subsequent ca	std slope td intercept erature during cal ure during calibra lg alculation of sam	ation (mm Hg) npler flow:			Average Average Samp	<ul> <li>Flow Calculation m3/min <ol> <li>302392012</li> </ol> </li> <li>Flow Calculation in CFM <ol> <li>45.98746193</li> </ol> </li> <li>le Time (Hrs): 1.0 <ol> <li>total Flow in m3/min</li> </ol> </li> </ul>
= corrected cha = actual chart re = calibrator Qs = calibrator Qs = actual tempe = actual pressu td = 298 deg K td = 760 mm H r subsequent ca	std slope td intercept erature during ca ure during calibra	ation (mm Hg) npler flow:			Average Average Samp T	<ul> <li>Flow Calculation m3/min <ol> <li>302392012</li> </ol> </li> <li>Flow Calculation in CFM <ol> <li>98746193</li> </ol> </li> <li>le Time (Hrs): 1.0 <ol> <li>0</li> <li>tal Flow in m3/min <ol> <li>78.14352069</li> </ol> </li> </ol></li></ul>
= corrected cha = actual chart re = calibrator Qs = calibrator Qs = actual tempe = actual pressu td = 298 deg K td = 760 mm H r subsequent ca	std slope td intercept erature during cal ure during calibra lg alculation of sam	ation (mm Hg) npler flow:			Average Average Samp T	<ul> <li>Flow Calculation m3/min <ol> <li>302392012</li> </ol> </li> <li>Flow Calculation in CFM <ol> <li>45.98746193</li> </ol> </li> <li>le Time (Hrs): 1.0 <ol> <li>total Flow in m3/min</li> </ol> </li> </ul>



			Site Iı	nformation		
	Location: AM4A Sampler: TE-5170			Zones 2A a Kowloon Cu 3998		Date: 6-Aug-22 Tech: CS Tang
			Site C	Conditions		
Barometric Pressure (in Hg): 29 Temperature (deg F): 82 Average Press. (in Hg): 29 Average Temp. (deg F): 82			2 9.75		Tempe Corrected Ave	ssure (mm Hg):         756           grature (deg K):         301           grage (mm Hg):         756           Temp. (deg K):         301
			Calibra	tion Orifice		
	Make: Tisch Model: TE-5025A Serial#: 3543				Qstd Slope: 2 Qstd Intercept: 0 Date Certified: 2	0.00347
			Calibratic	n Informatic	n	
Plate or Test # 1 2 3 4 5	H2O (in) 12.70 10.60 7.70 4.50 2.60	Qstd (m3/min) 1.745 1.594 1.359 1.038 0.789	I (chart) 53.0 48.0 41.0 33.0 23.0	IC (corrected) 52.59 47.63 40.69 32.75 22.82	# o	Linear Regression Slope: 30.0791 Intercept: 0.0438 Corr. Coeff: 0.9971 f Observations: 5
			Ca	alculations		
Qstd = 1/m[Sqrt(F IC = I[Sqrt(Pa/Pst Qstd = standard fl IC = corrected cha I = actual chart res	d)(Tstd/Ta)] ow rate art response	td/Ta))-b]			<ul> <li>m = sampler slop</li> <li>b = sampler inte</li> <li>I = chart respons</li> <li>Tav = daily avera</li> <li>Pav = daily avera</li> </ul>	rcept se ge temperature
m = calibrator Qs $m = calibrator Qs$ $b = calibrator Qst$ $Ta = actual tempe$ $Pa = actual pressu$ $Tstd = 298  deg K$ $Pstd = 760  mm H$ $For subsequent ca$ $1/m((I)[Sqrt(298/I)]$ $NOTE: Ensure cal$	td slope rature during cal re during calibra g lculation of sam Fav)(Pav/760)]-b	ation (mm Hg) pler flow:			Averag Averag Samj	verage I (chart): 40 e Flow Calculation m3/min 1.304957072 e Flow Calculation in CFM 46.07803422 ple Time (Hrs): 1.0 Total Flow in m3/min 78.29742434 Total Flow in CFM 2764.682053



			Site Ir	nformation		
Location: <sup>2</sup> Sampler: <sup>7</sup>				Zones 2A a Kowloon Cu 4344		Date: 10-Jun-22 Tech: CS Tang
			Site C	Conditions		
	Barometric Pro	essure (in Hg): 2			Corrected Press	ure (mm Hg): 754
	Tempe	erature (deg F): 7	9			ature (deg K): 299
		Press. (in Hg): 2	9.69		Corrected Avera	age (mm Hg): 754
	Average	Temp. (deg F): 7	9		Average T	emp. (deg K): 299
			Calibra	tion Orifice		
	Make:				Qstd Slope: 2	
		TE-5025A			Qstd Intercept: 0	
	Serial#:	3543			Date Certified: 20	U-UCT-21
			Calibratic	n Informatic	n	
Plate or	H2O	Qstd	I	IC		
Test #	(in)	(m3/min)	(chart)	(corrected)		Linear Regression
1 2	12.30 10.70	1.721 1.605	53.0 48.0	52.70 47.73		<b>Slope:</b> 30.2523 <b>Intercept:</b> -0.1430
	10.70	1.605	40.0	4/./3		
	7 90	1 379	41 0	40 77		Corr Coeff: 0 9972
3	7.90 4.60	1.379 1.052	41.0 33.0	40.77 32.81		Corr. Coeff: 0.9972
	7.90 4.60 2.50	1.379 1.052 0.775	41.0 33.0 23.0	40.77 32.81 22.87	# of	Corr. Coeff: 0.9972 Observations: 5
3 4	4.60	1.052	33.0 23.0	32.81	<b>#</b> of	
3 4 5	4.60	1.052 0.775	33.0 23.0	32.81 22.87	# of m = sampler slope	Observations: 5
3 4 5 td = 1/m[Sqrt(I	4.60 2.50 H2O(Pa/Pstd)(Ts	1.052 0.775	33.0 23.0	32.81 22.87		Observations: 5
3 4 5 td = 1/m[Sqrt(I	4.60 2.50 H2O(Pa/Pstd)(Ts	1.052 0.775	33.0 23.0	32.81 22.87	m = sampler slope	Observations: 5 e cept
3 4 5 cd = 1/m[Sqrt(I = I[Sqrt(Pa/Pst	4.60 2.50 H2O(Pa/Pstd)(Ts td)(Tstd/Ta)]	1.052 0.775	33.0 23.0	32.81 22.87	m = sampler slope b = sampler interc	Observations: 5
3 4 5 d = 1/m[Sqrt(I = I[Sqrt(Pa/Pst d = standard fl = corrected ch.	4.60 2.50 H2O(Pa/Pstd)(Ts td)(Tstd/Ta)] low rate lart response	1.052 0.775	33.0 23.0	32.81 22.87	m = sampler slope b = sampler interc I = chart response	Observations: 5 e cept e temperature
3 4 5 td = 1/m[Sqrt(I = I[Sqrt(Pa/Pst td = standard fl = corrected ch. actual chart re	4.60 2.50 H2O(Pa/Pstd)(Ts td)(Tstd/Ta)] low rate hart response esponse	1.052 0.775	33.0 23.0	32.81 22.87	m = sampler slop b = sampler intero I = chart response Tav = daily averag Pav = daily average	Observations: 5 e cept e temperature e pressure
3 4 5 td = 1/m[Sqrt(I = I[Sqrt(Pa/Pst td = standard fl = corrected ch actual chart re = calibrator Qs	4.60 2.50 H2O(Pa/Pstd)(Ts td)(Tstd/Ta)] low rate esponse esponse istd slope	1.052 0.775	33.0 23.0	32.81 22.87	m = sampler slop b = sampler intero I = chart response Tav = daily averag Pav = daily averag Ave	Observations: 5 e cept e temperature e pressure rrage I (chart): 40
3 4 5 td = 1/m[Sqrt(I = I[Sqrt(Pa/Pst td = standard fl = corrected ch actual chart re = calibrator Qs = calibrator Qs	4.60 2.50 H2O(Pa/Pstd)(Ts td)(Tstd/Ta)] low rate lart response esponse (std slope std intercept	1.052 0.775 std/Ta))-b]	33.0 23.0	32.81 22.87	m = sampler slop b = sampler intero I = chart response Tav = daily averag Pav = daily averag Ave	Observations: 5 e cept e temperature e pressure rrage I (chart): 40 Flow Calculation m3/min
3 4 5 td = 1/m[Sqrt(I = I[Sqrt(Pa/Pst td = standard fl = corrected cha actual chart re = calibrator Qs = actual tempe	4.60 2.50 H2O(Pa/Pstd)(Ts td)(Tstd/Ta)] low rate aart response esponse std slope std slope std intercept erature during cal	1.052 0.775 std/Ta))-b] libration (deg K)	33.0 23.0	32.81 22.87	m = sampler slope b = sampler intere I = chart response Tav = daily average Pav = daily average Ave Average	Observations: 5 e cept e temperature e pressure prage I (chart): 40 Flow Calculation m3/min 1.306252765
3 4 5 td = 1/m[Sqrt(I = I[Sqrt(Pa/Pst td = standard fl = corrected ch actual chart re = calibrator Qs = actual tempe = actual pressu	4.60 2.50 H2O(Pa/Pstd)(Ts td)(Tstd/Ta)] low rate eart response esponse std slope std slope std intercept erature during calibra	1.052 0.775 std/Ta))-b] libration (deg K)	33.0 23.0	32.81 22.87	m = sampler slope b = sampler intere I = chart response Tav = daily average Pav = daily average Ave Average	Observations: 5 e e e temperature e pressure rage I (chart): 40 Flow Calculation m3/min 1.306252765 Flow Calculation in CFM
3 4 5 td = 1/m[Sqrt(I = I[Sqrt(Pa/Pst td = standard fl = corrected ch: actual chart re = calibrator Qs = actual temps = actual pressu d = 298 deg K	4.60 2.50 H2O(Pa/Pstd)(Ts td)(Tstd/Ta)] low rate hart response esponse std slope std slope std intercept erature during calibra	1.052 0.775 std/Ta))-b] libration (deg K)	33.0 23.0	32.81 22.87	m = sampler slope b = sampler interd I = chart response Tav = daily averag Pav = daily average Average Average	Observations: 5 e cept e temperature e pressure rrage I (chart): 40 Flow Calculation m3/min 1.306252765 Flow Calculation in CFM 46.12378514
3 4 5 td = 1/m[Sqrt(I = I[Sqrt(Pa/Pst td = standard fl = corrected ch: actual chart re = calibrator Qs = actual temps = actual pressu td = 298 deg K td = 760 mm H	4.60 2.50 H2O(Pa/Pstd)(Ts td)(Tstd/Ta)] low rate hart response esponse std slope std slope std intercept erature during calibra Lyg	1.052 0.775 std/Ta))-b] libration (deg K) ation (mm Hg)	33.0 23.0	32.81 22.87	m = sampler slope b = sampler interd I = chart response Tav = daily averag Pav = daily average Average Average Sampl	Observations: 5 e e cept e temperature e pressure rrage I (chart): 40 Flow Calculation m3/min 1.306252765 Flow Calculation in CFM 46.12378514 le Time (Hrs): 1.0
3 4 5 td = 1/m[Sqrt(I = I[Sqrt(Pa/Pst td = standard fl = corrected ch. actual chart re = calibrator Qs = actual tempe = actual pressu td = 298 deg K td = 760 mm H r subsequent ca	4.60 2.50 H2O(Pa/Pstd)(Ts td)(Tstd/Ta)] low rate eart response esponse istd slope std intercept erature during calibra t Ig alculation of sam	1.052 0.775 std/Ta))-b] libration (deg K) ation (mm Hg)	33.0 23.0	32.81 22.87	m = sampler slope b = sampler interd I = chart response Tav = daily averag Pav = daily average Average Average Sampl	Observations: 5 e cept e temperature e pressure rrage I (chart): 40 Flow Calculation m3/min 1.306252765 Flow Calculation in CFM 46.12378514 le Time (Hrs): 1.0 otal Flow in m3/min
3 4 5 td = 1/m[Sqrt(I = I[Sqrt(Pa/Pst td = standard fl = corrected ch. : actual chart re = calibrator Qs = actual tempe = actual pressu td = 298 deg K td = 760 mm H r subsequent ca	4.60 2.50 H2O(Pa/Pstd)(Ts td)(Tstd/Ta)] low rate hart response esponse std slope std slope std intercept erature during calibra Lyg	1.052 0.775 std/Ta))-b] libration (deg K) ation (mm Hg)	33.0 23.0	32.81 22.87	m = sampler slope b = sampler intero I = chart response Tav = daily average Pav = daily average Average Average Sampl To	Observations: 5 e cept e temperature e pressure rrage I (chart): 40 Flow Calculation m3/min 1.306252765 Flow Calculation in CFM 46.12378514 le Time (Hrs): 1.0



			Site Iı	nformation		
Location: 2				Zones 2A a		Datas ( Aug. 22
			Serial No:	Kowloon Cu	illulai	Date: 6-Aug-22 Tech: CS Tang
Sampler: TE-5170			Senai Ino:	IJII		Tech: CD Tang
				Conditions		
Barometric Pressure (in Hg): 29.75						sure (mm Hg): 756
	-	erature (deg F): 8			-	rature (deg K): 301
		Press. (in Hg): 2				rage (mm Hg): 756
	Average	Temp. (deg F): <sup>8</sup>	2		Average 1	Cemp. (deg K): 301
			Calibra	tion Orifice		
	Make:				Qstd Slope: 2	
		TE-5025A			Qstd Intercept: 0	
	Serial#:	3543			Date Certified: 2	0-Oct-21
			Calibratic	on Informatic	n	
Plate or	H2O	Qstd	Ι	IC		
Test #	(in)	(m3/min)	(chart)	(corrected)		Linear Regression
1	12.60	1.738	53.0	52.59		Slope: 31.0531
2	10.80	1.609	48.0	47.63		Intercept: -1.5415
-				10 00		
3	7.50	1.341	41.0	40.69		Corr. Coeff: 0.9984
4	4.90	1.083	33.0	32.75	# of	
			33.0 23.0	32.75 22.82	# of	Corr. Coeff: 0.9984
4 5	4.90 2.70	1.083 0.804	33.0 23.0	32.75		Observations: 5
4 5 td = 1/m[Sqrt()	4 . 90 2 . 70 H2O(Pa/Pstd)(Ts	1.083 0.804	33.0 23.0	32.75 22.82	m = sampler slop	Observations: 5
4 5 :d = 1/m[Sqrt()	4 . 90 2 . 70 H2O(Pa/Pstd)(Ts	1.083 0.804	33.0 23.0	32.75 22.82	m = sampler slop b = sampler inter	Observations: 5
4 5 d = 1/m[Sqrt() = I[Sqrt(Pa/Ps	4 . 90 2 . 70 H2O(Pa/Pstd)(Ts std)(Tstd/Ta)]	1.083 0.804	33.0 23.0	32.75 22.82	m = sampler slop b = sampler inter I = chart response	<b>Observations:</b> 5 be cept e
4 5 td = 1/m[Sqrt() = I[Sqrt(Pa/Ps td = standard f	4.90 2.70 H2O(Pa/Pstd)(Ts td)(Tstd/Ta)] flow rate	1.083 0.804	33.0 23.0	32.75 22.82	m = sampler slop b = sampler inter I = chart respons Tav = daily averag	<b>Observations:</b> 5 be cept e ge temperature
4 5 d = 1/m[Sqrt(1 = I[Sqrt(Pa/Ps d = standard f = corrected ch	4.90 2.70 H2O(Pa/Pstd)(Ts std)(Tstd/Ta)] flow rate nart response	1.083 0.804	33.0 23.0	32.75 22.82	m = sampler slop b = sampler inter I = chart response	<b>Observations:</b> 5 be cept e ge temperature
4 5 d = 1/m[Sqrt() = I[Sqrt(Pa/Ps d = standard f = corrected ch actual chart re	4.90 2.70 H2O(Pa/Pstd)(Ts std)(Tstd/Ta)] flow rate hart response esponse	1.083 0.804	33.0 23.0	32.75 22.82	m = sampler slop b = sampler inter I = chart respons Tav = daily averag Pav = daily averag	<b>Observations:</b> 5 be cept e ge temperature ge pressure
4 5 td = 1/m[Sqrt() = I[Sqrt(Pa/Ps td = standard f = corrected ch actual chart re = calibrator Q	4.90 2.70 H2O(Pa/Pstd)(Ts std)(Tstd/Ta)] flow rate hart response esponse lstd slope	1.083 0.804	33.0 23.0	32.75 22.82	m = sampler slop b = sampler inter I = chart respons Tav = daily averag Pav = daily averag Ave	Cobservations: 5 be cept e ge temperature ge pressure erage I (chart): 40
4 5 td = 1/m[Sqrt() = I[Sqrt(Pa/Ps td = standard f = corrected ch actual chart re = calibrator Q = calibrator Qs	4.90 2.70 H2O(Pa/Pstd)(Ts std)(Tstd/Ta)] flow rate hart response esponse lostd slope std slope std intercept	1.083 0.804	33.0 23.0	32.75 22.82	m = sampler slop b = sampler inter I = chart respons Tav = daily averag Pav = daily averag Ave	Cobservations: 5 be cept e ge temperature terage I (chart): 40 e Flow Calculation m3/min
4 5 td = 1/m[Sqrt() = I[Sqrt(Pa/Ps td = standard f = corrected ch actual chart re = calibrator Q = calibrator Qs = actual tempe	4.90 2.70 H2O(Pa/Pstd)(Ts std)(Tstd/Ta)] flow rate hart response esponse lostd slope std slope std intercept erature during cal	1.083 0.804 ttd/Ta))-b] libration (deg K)	33.0 23.0	32.75 22.82	m = sampler slop b = sampler inter I = chart response Tav = daily averag Pav = daily averag Average	Cobservations: 5 Decepted decepted
4 5 td = 1/m[Sqrt(l = I[Sqrt(Pa/Ps td = standard f = corrected ch actual chart re = calibrator Q = calibrator Qs = actual tempe = actual pressu	4.90 2.70 H2O(Pa/Pstd)(Ts std)(Tstd/Ta)] flow rate nart response esponse esponse std slope std slope std intercept erature during cal ure during calibra	1.083 0.804 ttd/Ta))-b] libration (deg K)	33.0 23.0	32.75 22.82	m = sampler slop b = sampler inter I = chart response Tav = daily averag Pav = daily average Average Average	Cobservations: 5  Cobservations: 5  Cobservations: 5  Cobservations: 5  Cobservations: 5  Cobservations: 5  Cobservation for the servation of
4 5 d = 1/m[Sqrt(l = I[Sqrt(Pa/Ps d = standard f = corrected ch actual chart re = calibrator Q = calibrator Qs = actual tempe = actual pressi d = 298 deg K	4.90 2.70 H2O(Pa/Pstd)(Ts std)(Tstd/Ta)] flow rate hart response esponse 9std slope std intercept erature during calibra C	1.083 0.804 ttd/Ta))-b] libration (deg K)	33.0 23.0	32.75 22.82	m = sampler slop b = sampler inter I = chart respons Tav = daily averag Pav = daily averag Average Average	Cobservations: 5 Pe cept e ge temperature ge pressure erage I (chart): 40 e Flow Calculation m3/min 1.31507747 e Flow Calculation in CFM 46.43538548
4 5 td = 1/m[Sqrt() = I[Sqrt(Pa/Ps td = standard f = corrected ch actual chart re = calibrator Q = calibrator Qs = actual tempe = actual press td = 298 deg K d = 760 mm H	4.90 2.70 H2O(Pa/Pstd)(Ts std)(Tstd/Ta)] flow rate hart response esponse esponse estd slope std slope std intercept erature during calibra C Hg	1.083 0.804 atd/Ta))-b] libration (deg K) ation (mm Hg)	33.0 23.0	32.75 22.82	m = sampler slop b = sampler inter I = chart respons Tav = daily averag Pav = daily averag Average Average Samp	Cobservations: 5  Cobservations: 5  Cobservations: 5  Cobservations: 5  Cobservations: 5  Cobservations: 5  Cobservation for the servation of
4 5 d = 1/m[Sqrt() = I[Sqrt(Pa/Ps d = standard f = corrected ch actual chart re = calibrator Q = calibrator Qs = actual tempe = actual press d = 298 deg K d = 760 mm H	4.90 2.70 H2O(Pa/Pstd)(Ts std)(Tstd/Ta)] flow rate hart response esponse 9std slope std intercept erature during calibra C	1.083 0.804 td/Ta))-b] libration (deg K) ation (mm Hg) pler flow:	33.0 23.0	32.75 22.82	m = sampler slop b = sampler inter I = chart respons Tav = daily averag Pav = daily averag Average Average Samp	Cobservations: 5 Pe ccept e ge temperature ge pressure erage I (chart): 40 e Flow Calculation m3/min 1.31507747 e Flow Calculation in CFM 46.43538548 ele Time (Hrs): 1.0
4 5 td = 1/m[Sqrt() = I[Sqrt(Pa/Ps td = standard f = corrected ch = catual chart re = calibrator Q = calibrator Qs = actual tempo = actual press td = 298 deg K td = 760 mm H r subsequent ca	4.90 2.70 H2O(Pa/Pstd)(Ts std)(Tstd/Ta)] flow rate hart response esponse lstd slope std slope std intercept erature during calibra G Ig alculation of sam	1.083 0.804 td/Ta))-b] libration (deg K) ation (mm Hg) pler flow:	33.0 23.0	32.75 22.82	m = sampler slop b = sampler inter I = chart respons Tav = daily averag Pav = daily averag Average Average Samp T	<ul> <li>Cobservations: 5</li> <li>Cobservat</li></ul>



# **CERTIFICATE OF ACCREDITATION**

This is to attest that

# **AQUALITY TESTCONSULT LIMITED**

11A&B, KAI FONG GARDEN, PING CHE ROAD FANLING, HONG KONG

**Calibration Laboratory CL-207** 

has met the requirements of AC204, *IAS Accreditation Criteria for Calibration Laboratories*, and has demonstrated compliance with ISO/IEC Standard 17025:2017, *General requirements for the competence of testing and calibration laboratories*. This organization is accredited to provide the services specified in the scope of accreditation.

Effective Date December 17, 2021

Expiration Date December 1, 2022



President

Visit www.iasonline.org for current accreditation information.

International Accreditation Service, Inc. 3060 Saturn Street, Suite 100, Brea, California 92821, U.S.A. | www.iasonline.org

# **AQUALITY TESTCONSULT LIMITED**

# Contact Name Lee Mei Yee

Contact Phone + 852-6309-2280

Accredited to ISO/IEC 17025:2017

Effective Date December 17, 2021

LIBRATION AND MEASURE	MENT CAPABILITY	(CMC)*
RANGE	UNCERTAINTY <sup>1,2</sup> (±)	CALIBRATION PROCEDURE AND/OR STANDARD EQUIPMENT USED
Dimens	ional	
0 mm to 300 mm	30 µm	Checker by comparison method (BS 887:1982)
1 mm to 1000 mm	280 µm	Reference Steel Rule by comparison method (BS 4372:1968)
0 mm to 50 mm	8 µm	Reference micrometer head by comparison method (BS 907:2008)
0.01 mm to 1 mm	8 µm	Reference Dial Gauge by comparison method (BS 957: 2008)
0 m to 5 m	1200 µm	Reference steel ruler by comparison method (BS 4035:1966)
Length: 0 mm to 160 mm	20 µm	Reference engineering square and Feeler Gauge (BS 939:2007)
Diameter: 0 mm to 200 mm Thickness: 1.5 mm Height: 0 mm to 300 mm	560 μm 100 μm 560 μm	Reference Caliper & Reference Steel ruler by direct measurement (Verification in accordance with in-house method for the dimensional requirements as specified CS1:1990 Vol.1 A4; CS1: 2010 Vol. 1, A5)
	RANGE         Dimense         0 mm to 300 mm         1 mm to 1000 mm         1 mm to 50 mm         0 mm to 50 mm         0.01 mm to 1 mm         0.01 mm to 1 mm         0 m to 5 m         Length:         0 mm to 160 mm         Diameter:         0 mm to 200 mm         Thickness: 1.5 mm	Length:       Ο mm to 300 mm       30 μm         0 mm to 300 mm       30 μm         1 mm to 1000 mm       280 μm         0 mm to 50 mm       8 μm         0.01 mm to 1 mm       8 μm         0 m to 5 m       1200 μm         Diameter:       0 mm to 160 mm         Diameter:       560 μm         Thickness: 1.5 mm       100 μm

\* If information in this CMC is presented in non-SI units, the conversion factors stated in NIST Special Publication 811 "Guide for the Use of the International System of Units (SI)" apply.





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MEASURED QUANTITY or DEVICE TYPE CALIBRATED	RANGE	UNCERTAINTY <sup>1,2</sup> (±)	CALIBRATION PROCEDURE AND/OR STANDARD EQUIPMENT USED
Tamping rod <sup>3</sup>	Diameter: 0 mm to 16 mm	600 µm	Reference steel ruler & Reference Caliper by direct
	Length: 600 mm	950 µm	measurement (Verification in accordance with in-house method for the dimensional requirements as specified CS1:1990 Vol.1 A5; CS1: 2010 Vol. 1, A6)
Cube mould <sup>3</sup>	(Max dimensions 150 mm per side)		Reference Caliper, straight edge & feeler gauge by
	Dimension	50 µm	direct measurement. (Verification in accordance with in-house method for the
	Flatness	10 µm	dimensional requirements as specified in BS1881: Part
	Perpendicularity	10 µm	108:1983; CS1:1990 Vol1, A21; CS1:2010 Vol 1, A25;
	Parallelism	50 µm	BS EN 12390-2:2000)
Compacting Bar <sup>3</sup>	Ramming Face: 25 mm	100 µm	Reference Caliper & Steel ruler by direct measurement.
	Length: 380 mm	560 µm	(Verification in accordance with in-house method for the
	Weight: 1.8 kg	1 g	dimensional & mass requirements as specified in BS 1881: Part 105:1984 Cl 3.3; CS1:1990 Vol 2, E3 CS1:2010 Vol 1, A15.3; BS EN 12350 -5:2000 Cl 4.3.)
Covermeter	20 mm to 103 mm	2.9 mm	Reference concrete block (Verification in accordance with in-house method for the dimensional requirements as specified in BS 1881- 204:1988 CI.6.4- Method C)
Flow table <sup>3</sup>	15 kg to 17 kg 1 mm up to 71 mm	12 g 600 μm	Weighing Balance, Reference caliper & Reference steel ruler by direct measurement
Test Sieve <sup>3</sup>	4 mm to 50 mm	50 µm	Reference Caliper by direct measurement
	Mechar	nical	
Force Measuring Machine <sup>3</sup> (Compression Mode)		0.4 %	Reference Load cell by direct measurement BS 1610: Part 1:1985; BS 1610: Part 1:1992; BS EN ISO 12390-4:2000 Annex B; BS EN ISO 7500-1:2004





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MEASURED QUANTITY or DEVICE TYPE CALIBRATED	RANGE	UNCERTAINTY <sup>1,2</sup> (±)	CALIBRATION PROCEDURE AND/OR STANDARD EQUIPMENT USED
Laser Dust Meter <sup>3</sup>	Dust particles 0.001 mg/m <sup>3</sup> to 10.00 mg/m <sup>3</sup>	0.9 mg/m³	By comparison method by using reference laser dust meter
Rebound Hammer <sup>3</sup>	80 unit (hardness)	1.6 rebound count	Reference Rebound count by comparison method. BS1881: Part 202:1986; BS EN 12504-2:2001; BS EN 12504-2:2012
Mass (F2 class and coarser)	0 g to 200 g 200 g to 5 kg 5 kg to 10 kg 10 kg to 50 kg	1.3 mg 0.5 g 0.88 g 3 g	Standard Weight E2/ F1 Class & Weighing Balances by comparison method (OIML-R-111)
Weighing Scale & Balance <sup>3</sup>	0 g to 200 g 0 kg to 5 kg 0 kg to 50 kg	0.8 mg 0.13 g 7.7 g	Standard weight of E2/F1 Grade by direct measurement (OIML-R-111)
Volumetric Glassware	1 mL to 100 mL 100 mL to 1000 mL	0.004 mL 0.09 mL	Standard weight E2 Class, Weighing Balances & Distilled water by gravimetric method
	Ther	mal	
Digital/Liquid in Glass Thermometers & RTD/ Thermocouples with or without Indicators	15 °C to 55 °C 55 °C to 95 °C	0.4 °C 0.9 °C	Water Baths, Reference Sensor and Indictor by Comparison Method (OIML R133)
Curing Tank <sup>3</sup>	(Calibration at 20 °C & 27 °C @ 30 min) 20 °C Temperature distribution 27 °C Temperature distribution Efficiency of circulation	0.4 °C 0.8 °C 5 s	Reference Temperature datalogger by Mapping Method & Reference Stop Watch (Verification in accordance with in-house method for the Temp & Time requirements as specified in BS1881-111:1983 CS1:1990 Vol 1 App A24 CS1:2010 Vol 1 App A28 BE EN 12390-2:2000
Oven <sup>3</sup>	40.0 °C to 180.0 °C	1.5 °C	Reference Temperature datalogger by Mapping Method (AS 2853:1986)
Furnace <sup>3</sup>	200 °C to 1300 °C	6 °C	Reference Thermocouple with Indicator By single point Calibration (AS 2853:1986)
Water bath <sup>3</sup>	15 °C to 95 °C	0.2 °C	Reference Temperature datalogger by Mapping Method (AS 2853:1986)





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MEASURED QUANTITY or DEVICE TYPE CALIBRATED	RANGE	UNCERTAINTY <sup>1,2</sup> (±)	CALIBRATION PROCEDURE AND/OR STANDARD EQUIPMENT USED
	Time and Fi	requency	
Stop Watch / Timer <sup>3</sup>	0 s to 3600 s 0 s to 21600 s (6 hours) 0 s to 86400 s (24 hours)	0.2 s 0.6 s 0.61 s	Reference stop watch
Grout Flow Cone <sup>3</sup>	7 s to 9 s	0.2 s	Reference stop watch by direct method (ASTM C939-10 Cl.9)

<sup>1</sup>The uncertainty covered by the Calibration and Measurement Capability (CMC) is expressed as the expanded uncertainty having a coverage probability of approximately 95 %. It is the smallest measurement uncertainty that a laboratory can achieve within its scope of accreditation when performing calibrations of a best existing device. The measurement uncertainty reported on a calibration certificate may be greater than that provided in the CMC due to the behavior of the calibration item and other factors that may contribute to the uncertainty of a specific calibration.

<sup>2</sup>When uncertainty is stated in relative terms (such as percent, a multiplier expressed as a decimal fraction or in scientific notation), it is in relation to instrument reading or instrument output, as appropriate, unless otherwise indicated.

<sup>3</sup>Also available as site calibration. Note that actual measurement uncertainties achievable at a customer's site can normally be expected to be larger than the uncertainties listed on this Scope of Accreditation





# FAQ / Information

# Mutual Recognition Arrangements (MRA) / Multilateral Recognition Arrangements (MLA)

# Mutual Recognition Arrangement (MRA) Partners for HOKLAS 🔨

Every effort is made to promote acceptance of test data from accredited laboratories, both internationally and locally. HKAS has concluded mutual recognition arrangements with accreditation bodies listed below by being one of the signatories of the <u>International Laboratory Accreditation</u> <u>Cooperation Mutual Recognition Arrangement (ILAC MRA)</u> and the <u>Asia Pacific Accreditation Cooperation</u> <u>Mutual Recognition Arrangement (APAC MRA)</u> for testing, calibration, medical testing, Proficiency Testing Providers (PTP) and Reference Material Producers (RMP). Click <u>here</u> to view the up-to-date signatories of ILAC and <u>here</u> to access the up-to-date signatories of APAC.

Visitors checking the names, logos and accreditation symbols shown on an endorsed certificate or report should note that some of our MRA partners may have their names, logos or accreditation symbols changed recently and test reports or certificates endorsed by displaying their old accreditation symbols may still be valid during the change-over period. For details, please visit their websites or contact them directly.

» Mutual Recognition Arrangement (MRA) Partners for HOKLAS

HKAS MRA partners will recognise HOKLAS endorsed test certificates as having the same technical validity as certificates endorsed by their respective schemes.

# Multilateral Recognition Arrangements (MLA) for HKCAS 🔨

HKAS has been a signatory of <u>Asia Pacific Accreditation Cooperation Mutual Recognition Arrangement</u> (<u>APAC MRA</u>) for Quality Management System (QMS), Environmental Management System (EMS), Food Safety Management System (FSMS), Energy Management System (EnMS), Occupational Health and Safety Management System (OHSMS) certifications, product certifications, and Greenhouse Gas (GHG) validation and verification.

HKAS has also been a signatory of the <u>International Accreditation Forum Multilateral Recognition</u> <u>Arrangement (IAF MLA)</u> for Quality Management System (QMS), Environmental Management System (EMS), Food Safety Management System (FSMS), Energy Management System (EnMS), Occupational Health and Safety Management System (OHSMS) certifications, product certifications, and Greenhouse Gas (GHG) validation and verification.

Click <u>here</u> to view the up-to-date signatories of IAF and <u>here</u> to access the up-to-date signatories of APAC.

» Mutual / Multilateral Recognition Arrangements (MRA / MLA) Partners for HKCAS

# Mutual Recognition Arrangement (MRA) Partners for HKIAS <

HKAS has concluded mutual recognition arrangements with accreditation bodies listed below by being one of the signatories of the International Laboratory Accreditation Cooperation Mutual Recognition Arrangement (ILAC MRA) and Asia Pacific Accreditation Cooperation Mutual Recognition Arrangement (APAC MRA) for inspection. Click here to view the up-to-date signatories of ILAC and here to access the up-to-date signatories of APAC.

HKAS MRA partners will recognise HKIAS endorsed inspection reports or certificates having the same technical validity as reports or certificates endorsed by their respective schemes.

» Mutual Recognition Arrangement (MRA) Partners for HKIAS

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Economy	Logo	Name of Partner	URL	Test Area
United States of America	IAS INTERNATIONAL ACCREDITATION SERVICE*	International Accreditation Service Inc. (IAS)	www.iasonline.org	Calibration, Non-medical Testing
United States of America	galvn	National Voluntary Laboratory Accreditation Program (NVLAP)	www.nist.gov/nvlap	Calibration, Non-medical Testing
United States of America	PILA	Perry Johnson Laboratory Accreditation, Inc. (PJLA)	www.pjlabs.com	Calibration, Medical Testing, Reference Material Producer, Non-medical Testing
Uruguay	ORGANISMO URUGUANO DE ACREDITACION	Organismo Uruguayo de Acreditación (OUA)	www.organismouruguayo deacreditacion.org	Calibration, Non-medical Testing
Viet Nam		Accreditation Office for Standards Conformity Assessment Capacity (AOSC)	aosc.vn/	Calibration, Medical Testing, Non-medical Testing
Viet Nam		Bureau of Accreditation (BoA)	www.boa.gov.vn	Calibration, Medical Testing, Non-medical Testing

# Hong Kong Laboratory Accreditation Scheme (HOKLAS) - Mutual Recognition Arrangement (MRA) Partners

# **AQuality**

東恒測試顧問有限公司

AQUALITY TESTCONSULT LIMITED

# 香港新界粉嶺坪輋路啟芳園11A&11B號

No. 11A&B, KAI FONG GARDEN, PING CHE ROAD, FANLING, NEW TERRITORIES, HONG KONG TEL : 852-3582-9589 FAX : 852-2674-1177 EMAIL : cal.aqtl@gmail.com WEBSITE: www.aqtlgroup.com

	CERTIFICATE OF CALIBRATION
Report Number	: 210918MCA-126F
Date of Report	: 21-Sep-21
Page Number	: 1 of 2
Customer *	: Apex Testing & Certification Ltd.
Customer Address*	: Unit D6A, 10/F, TML Tower, 3 Hoi Shing Road, Tsuen Wan, N.T., HK
Customers Ref. *	: A005
Item Under Calibration (IUC)	*
Equipment No.	: N/A
Manufacturer	· Sibata Scientific Technology Ltd

Equipment No.	$\cdot 1$ V/A
Manufacturer	: Sibata Scientific Technology Ltd
Model No.	: LD-3B
Serial No.	: 235811
Scale Division	: 0.001 mg/m3
Range	: 0.001 to 1 mg/m3
Condition of Item	: Normal
- Dessired	. 10 Car 01

Date Item Received	: 18	8-Sep-21		
Date Calibrated	: 18	8-Sep-21		
Calibration Location	: A	Quality Ca	alibration Lab.	
Date of Next Calibration	:17	-Sep-22		
Calibrated By	: Je	ssica Liu		
Test Environment				
Ambient Temperature	:	28.3	°C to	33.2
Relative Humidity	:	55	% to	79

# **Calibration Results**

Reference True Reading (mg/m3)	Average IUC Reading $(mg/m^3)$	Correction (mg/m <sup>3</sup> )	Error of IUC Reading (%)	Expanded Uncertainty (mg/m <sup>3</sup> )	Coverage Factor K
0.158	0.167	-0.008	5.1%	0.020	2.0
5.164	5.647	-0.484	8.5%	0.463	2.0
10.100	11.141	-1.041	9.3%	0.904	2.0

# <u>Remarks</u>

- 1. \* Denotes information supplied by customer.
- 2. The results relate only to the items calibrated.
- 3. The results apply to the items as received.

:

- 4. Correction = Average of (Ref reading IUC reading)
- 5. The technical requirement of laser dust meter. +/- 20% error for the particles concentration.

°C %

Approved by:

LEE Mei Yee, Julia Managing Director

The results shown in this certificate are metrologically traceable to the International System of Units (SI) or recognised measurement standards. The certificate shall not be reproduced except in full without approval of the laboratory.



AQuality AQUALITY TESTCONSULT LIMITED

## 香港新界粉嶺坪黃路啟芳園11A&11B號

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|--|

Report Number	: 210918MCA-126F
Date of Report	: 21-Sep-21
Page Number	: 2 of 2
Customer *	: Apex Testing & Certification Ltd.
Customers Ref. *	: A005

# **Details of Calibration**

- 1. The calibration was performed in accordance with AQuality Testconsult Procedure Number ENV-L-003 (in-house method), by comparison with the laboratory's reference equipment which have traceable international standards of measurement.
- 2. The item under calibration (IUC) was allowed to stabilize in the laboratory for 0.25 hour before commencement of calibration.
- 3. A set of readings were made at each calibration concentration. The values quoted in the results are the average of each set of readings.
- 4. The values given in this calibration certificate only relate to the values measured at the time of calibration. Any uncertainties quoted do not include allowance for the capabiliy of any other laboratory to repeat the measurement. The uncertainty quoted relate only to item at time of calibration. AQuality Testconsult Limited is not liable for any loss or damage resulting from the use of this equipment.
- 5. The identification, calibration certificate numbers for the reference equipment used were as follows :

Equipment Number	Certificate Number	Description
CH-LDM-1	HBW202001563	粉尘测试仪

6. Copies of the Calibration certificates of the reference equipment used in this calibration may be obtained from AQuality Testconsult Limited, if necessary.

- End of Report -



# 東恒測試顧問有限公司 AQUALITY TESTCONSULT LIMITED 香港新界粉嶺坪輋路啟芳園11A&11B號

No. 11A&11B, KAI FONG GARDEN, PING CHE ROAD, FANLING, N.T., HONG KONG

# **CERTIFICATE OF CALIBRATION**

Apex Testing & Certification Ltd.	Test Report No.	210918MCA-126F
Unit D6A 10/E TML Tower 2 Hoi Shing	Date of Issue	21-Sep-21
Unit D6A, 10/F, TML Tower, 3 Hoi Shing Road, Tsuen Wan, N.T., HK	Date of Testing	18-Sep-21
Koau, Isueli wali, N.I., IIK	Page	1 of 1

# **Item for Calibration**

Description	: Laser Dust Monitor
Manufacturer	: Sibata Scientific Technology Ltd
Model No.	: LD-3B
Serial No.	: 235811

# **Standard Equipment**

Description	:	High Volume Sampler / Calibration Orifice
Manufacturer	:	Tisch Environmental, Inc.
Model No.	:	TE-5170 / TE-5025A
Serial No.		3476 / 3543
Last Calibration	:	17-SEP-21 / 2-Nov-20

	T.	Mean Temp	Mean	Concentration Standard	Concentration Calibrated
Date	Time	Ĩ	Pressure	Equipment	Equipment
		(°C)	(hPa)	(mg/m3)	(mg/m3)
18-Sep-21	19:00	30.8	1011.1	0.0613	0.0616
18-Sep-21	20:05	30.8	1011.1	0.0587	0.0586
18-Sep-21	21:10	30.8	1011.1	0.0596	0.0600

By Linear Regression of	Y or X	0.064				
Slope (K-factor)	: 1.1031	0.062		y = 1.1031x R <sup>2</sup> = 0.9		
Correlation Coefficient	: 0.9804	0.06		K = 0.9		
Validity of Calibration	: 17-Sep-22	0.058			•	
·		0.056				
		0.054				
		0.052				
		0.05	0.045 0	0.05 0.055	5 0.06	0.065
Recorded by	: Jessica Liu	Signature	Jessin Mary	I	Date: <u>18</u>	3-Sep-21

Checked by

Signature:

S Tang

:

Date: 18-Sep-21

# **AQuality**

東恒測試顧問有限公司

AQUALITY TESTCONSULT LIMITED

# 香港新界粉嶺坪輋路啟芳園11A&11B號

No. 11A&B, KAI FONG GARDEN, PING CHE ROAD, FANLING, NEW TERRITORIES, HONG KONG TEL : 852-3582-9589 FAX : 852-2674-1177 EMAIL : cal.aqtl@gmail.com WEBSITE: www.aqtlgroup.com

	CERTIFICATE OF CALIBRATION
Report Number	: 210918MCA-123F
Date of Report	: 21-Sep-21
Page Number	: 1 of 2
Customer *	: Apex Testing & Certification Ltd.
Customer Address*	: Unit D6A, 10/F, TML Tower, 3 Hoi Shing Road, Tsuen Wan, N.T., HK
Customers Ref. *	: A005
Item Under Calibration (IUC)	*
Equipment No.	: N/A
Manufacturer	: Sibata Scientific Technology Ltd
Model No.	: LD-3B
Serial No.	: 336338
Scale Division	: 0.001 mg/m3

Condition of Item	: No	rmal			
Date Item Received Date Calibrated Calibration Location Date of Next Calibration Calibrated By	: 18-Sep-21 : 18-Sep-21 : AQuality Calibration Lab. : 17-Sep-22 : Jessica Liu				
Test Environment					
Ambient Temperature	:	28.3	°C to	33.2	°C
Relative Humidity	:	55	% to	79	%

: 0.001 to 1 mg/m3

# **Calibration Results**

Range

Reference True Reading (mg/m3)	Average IUC Reading $(mg/m^3)$	Correction (mg/m <sup>3</sup> )	Error of IUC Reading (%)	Expanded Uncertainty (mg/m <sup>3</sup> )	Coverage Factor K
0.158	0.168	-0.010	5.7%	0.026	2.0
5.164	5.562	-0.398	7.1%	0.462	2.0
10.100	10.936	-0.837	7.6%	0.905	2.0

# Remarks

- 1. \* Denotes information supplied by customer.
- 2. The results relate only to the items calibrated.
- 3. The results apply to the items as received.

:

- 4. Correction = Average of (Ref reading IUC reading)
- 5. The technical requirement of laser dust meter. +/- 20% error for the particles concentration.

Approved by:

LEE Mei Yee, Julia Managing Director

The results shown in this certificate are metrologically traceable to the International System of Units (SI) or recognised measurement standards. The certificate shall not be reproduced except in full without approval of the laboratory.



AQuality AQUALITY TESTCONSULT LIMITED

## 香港新界粉嶺坪黃路啟芳園11A&11B號

No. 11A&11B, KAI FONG GARDEN, PING CHE ROAD, FANLING, NEW TERRITORIES, HONG KONG TEL: 852-3582-9589 FAX: 852-2674-1177 EMAIL: cal.aqtl@gmail.com WEBSITE: www.aqtlgroup.com

<b>CERTIFICATE OF</b>	CALIBRATION

Report Number	: 210918MCA-123F
Date of Report	: 21-Sep-21
Page Number	: 2 of 2
Customer *	: Apex Testing & Certification Ltd.
Customers Ref. *	: A005

# **Details of Calibration**

- 1. The calibration was performed in accordance with AQuality Testconsult Procedure Number ENV-L-003 (in-house method), by comparison with the laboratory's reference equipment which have traceable international standards of measurement.
- 2. The item under calibration (IUC) was allowed to stabilize in the laboratory for 0.25 hour before commencement of calibration.
- 3. A set of readings were made at each calibration concentration. The values quoted in the results are the average of each set of readings.
- 4. The values given in this calibration certificate only relate to the values measured at the time of calibration. Any uncertainties quoted do not include allowance for the capabiliy of any other laboratory to repeat the measurement. The uncertainty quoted relate only to item at time of calibration. AQuality Testconsult Limited is not liable for any loss or damage resulting from the use of this equipment.
- 5. The identification, calibration certificate numbers for the reference equipment used were as follows :

Equipment Number	Certificate Number	Description
CH-LDM-1	HBW202001563	粉尘测试仪

6. Copies of the Calibration certificates of the reference equipment used in this calibration may be obtained from AQuality Testconsult Limited, if necessary.

- End of Report -



# 東恒測試顧問有限公司 AQUALITY TESTCONSULT LIMITED 香港新界粉嶺坪輋路啟芳園11A&11B號

No. 11A&11B, KAI FONG GARDEN, PING CHE ROAD, FANLING, N.T., HONG KONG

# **CERTIFICATE OF CALIBRATION**

Apex Testing & Certification Ltd.	Test Report No.	210918MCA-123F
II nit D6A 10/F TML Tower 3 Hoi Shing	Date of Issue	21-Sep-21
	Date of Testing	18-Sep-21
	Page	1 of 1

# **Item for Calibration**

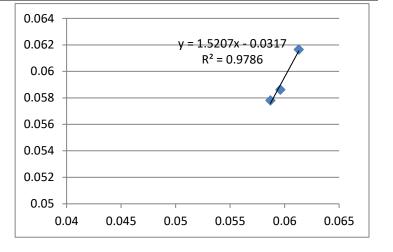
Description	: Laser Dust Monitor
Manufacturer	: Sibata Scientific Technology Ltd
Model No.	: LD-3B
Serial No.	: 336338

# **Standard Equipment**

Description	: High Volume Sampler / Calibration Orifice
Manufacturer	: Tisch Environmental, Inc.
Model No.	: TE-5170 / TE-5025A
Serial No.	3476 / 3543
Last Calibration	: 17-SEP-21 / 2-Nov-20
Lust Cultorution	

Date	Time	Mean Temp	Mean Pressure	Concentration Standard Equipment	Concentration Calibrated Equipment
		(°C)	(hPa)	(mg/m3)	(mg/m3)
18-Sep-21	19:00	30.8	1011.1	0.0613	0.0617
18-Sep-21	20:05	30.8	1011.1	0.0587	0.0578
18-Sep-21	21:10	30.8	1011.1	0.0596	0.0586

By Linear Regression of Y or X					
Slope (K-factor) :	1.5207				
Correlation Coefficient :	0.9786				
Validity of Calibration :	17-Sep-22				



Recorded by	:	Jessica Liu	Signature:	Jeasin	Date:	18-Sep-21
Checked by	:	S Tang	Signature:	Trug	Date:	18-Sep-21

# **AQuality**

東恒測試顧問有限公司

AQUALITY TESTCONSULT LIMITED

# 香港新界粉嶺坪輩路啟芳園11A&11B號

No. 11A&B, KAI FONG GARDEN, PING CHE ROAD, FANLING, NEW TERRITORIES, HONG KONG TEL : 852-3582-9589 FAX : 852-2674-1177 EMAIL : cal.aqtl@gmail.com WEBSITE: www.aqtlgroup.com

	CERTIFICATE OF CALIBRATION
Report Number	: 210918MCA-125F
Date of Report	: 21-Sep-21
Page Number	: 1 of 2
Customer *	: Apex Testing & Certification Ltd.
Customer Address*	: Unit D6A, 10/F, TML Tower, 3 Hoi Shing Road, Tsuen Wan, N.T., HK
Customers Ref. *	: A005
Item Under Calibration (IUC) <sup>3</sup>	*
Equipment No.	: N/A
Manufacturer	: Sibata Scientific Technology Ltd
Model No.	: LD-3B
Serial No.	: 567188
Scale Division	: 0.001 mg/m3
Range	: 0.001 to 1 mg/m3

Condition of Item	: No	ormal	-		
Date Item Received Date Calibrated Calibration Location Date of Next Calibration	: 18 : A	8-Sep-21 8-Sep-21 Quality Ca 7-Sep-22	alibration Lab.		
Calibrated By	: Je	ssica Liu			
Test Environment					
Ambient Temperature	:	28.3	°C to	33.2	°C
Relative Humidity	:	55	% to	79	%

# **Calibration Results**

Referen True Rea (mg/m	ading	Average IUC Reading $(mg/m^3)$	Correction (mg/m <sup>3</sup> )	Error of IUC Reading (%)	Expanded Uncertainty (mg/m <sup>3</sup> )	Coverage Factor K
0.158		0.167	-0.008	4.9%	0.023	2.0
5.164		5.693	-0.530	9.3%	0.463	2.0
10.100	)	11.045	-0.945	8.6%	0.905	2.0

# Remarks

- 1. \* Denotes information supplied by customer.
- 2. The results relate only to the items calibrated.
- 3. The results apply to the items as received.

:

- 4. Correction = Average of (Ref reading IUC reading)
- 5. The technical requirement of laser dust meter. +/- 20% error for the particles concentration.

Approved by:

LEE Mei Yee, Julia Managing Director

The results shown in this certificate are metrologically traceable to the International System of Units (SI) or recognised measurement standards. The certificate shall not be reproduced except in full without approval of the laboratory.



AQuality AQUALITY TESTCONSULT LIMITED

## 香港新界粉嶺坪黃路啟芳園11A&11B號

No. 11A&11B, KAI FONG GARDEN, PING CHE ROAD, FANLING, NEW TERRITORIES, HONG KONG TEL: 852-3582-9589 FAX: 852-2674-1177 EMAIL: cal.aqtl@gmail.com WEBSITE: www.aqtlgroup.com

|--|

Report Number	: 210918MCA-125F
Date of Report	: 21-Sep-21
Page Number	: 2 of 2
Customer *	: Apex Testing & Certification Ltd.
Customers Ref. *	: A005

# **Details of Calibration**

- 1. The calibration was performed in accordance with AQuality Testconsult Procedure Number ENV-L-003 (in-house method), by comparison with the laboratory's reference equipment which have traceable international standards of measurement.
- 2. The item under calibration (IUC) was allowed to stabilize in the laboratory for 0.25 hour before commencement of calibration.
- 3. A set of readings were made at each calibration concentration. The values quoted in the results are the average of each set of readings.
- 4. The values given in this calibration certificate only relate to the values measured at the time of calibration. Any uncertainties quoted do not include allowance for the capabiliy of any other laboratory to repeat the measurement. The uncertainty quoted relate only to item at time of calibration. AQuality Testconsult Limited is not liable for any loss or damage resulting from the use of this equipment.
- 5. The identification, calibration certificate numbers for the reference equipment used were as follows :

Equipment Number	Certificate Number	Description
CH-LDM-1	HBW202001563	粉尘测试仪

6. Copies of the Calibration certificates of the reference equipment used in this calibration may be obtained from AQuality Testconsult Limited, if necessary.

- End of Report -



# 東恒測試顧問有限公司 AQUALITY TESTCONSULT LIMITED 香港新界粉嶺坪輋路啟芳園11A&11B號

No. 11A&11B, KAI FONG GARDEN, PING CHE ROAD, FANLING, N.T., HONG KONG

# **CERTIFICATE OF CALIBRATION**

Apex Testing & Certification Ltd.	Test Report No.	210918MCA-125F
Unit D6A 10/E TML Tower 2 Hoi	Date of Issue	21-Sep-21
Unit D6A, 10/F, TML Tower, 3 Hoi Shing Road, Tsuen Wan, N.T., HK	Date of Testing	18-Sep-21
Sinnig Koad, Tsuen Wan, N.T., HK	Page	1 of 1

# **Item for Calibration**

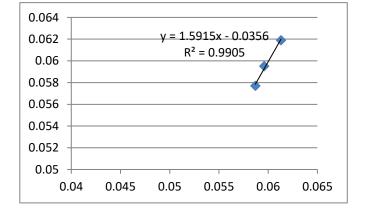
Description	: Laser Dust Monitor
Manufacturer	: Sibata Scientific Technology Ltd
Model No.	: LD-3B
Serial No.	: 567188

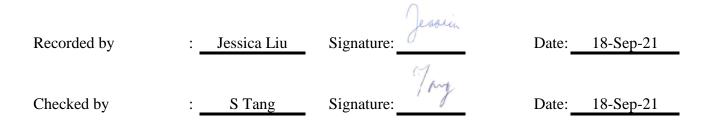
# **Standard Equipment**

Description	: High Volume Sampler / Calibration Orifice
Manufacturer	: Tisch Environmental, Inc.
Model No.	: TE-5170 / TE-5025A
Serial No.	3476 / 3543
Last Calibration	: 17-SEP-21 / 2-Nov-20

Date	Time	Mean Temp	Mean Pressure	Concentration Standard Equipment	Concentration Calibrated Equipment
		(°C)	(hPa)	(mg/m3)	(mg/m3)
18-Sep-21	19:00	30.8	1011.1	0.0613	0.0619
18-Sep-21	20:05	30.8	1011.1	0.0587	0.0577
18-Sep-21	21:10	30.8	1011.1	0.0596	0.0595

By Linear Regression of `	Y or X
Slope (K-factor) :	1.5915
Correlation Coefficient :	0.9905
Validity of Calibration :	17-Sep-22







# 综合試驗有限公司 SOILS & MATERIALS ENGINEERING CO., LTD. 香港新界葵涌水基路22-24號好爸爸創科大廈



Good Ba Ba Hitech Building, Nos. 22-24 Wing Kei Road, Kwai Chung, New Territories, Hong Kong Tel: (852) 2873 6860 Fax: (852) 2555 7533 E-mail: smec@cigismec.com Website: www.cigismec.com

# **CERTIFICATE OF CALIBRATION**

Certificate No.:	21CA0928 03-05		Page	1	of	2
Item tested						
Description: Manufacturer: Type/Model No.: Serial/Equipment No.: Adaptors used:	Sound Level Mete Hangzhou Aihua I AWA5661 301135 -	er (Class 1) , Instruments Co., Ltd , , ,	Microphone - AWA14425 15338 -			
Item submitted by						
Customer Name: Address of Customer: Request No.: Date of receipt:	Apex Testing & C Unit D6A, 10/F, T - 28-Sep-2021		g Road, Tsuen Wan, N.T.			
Date of test:	04-Oct-2021					
Reference equipment	used in the calib	oration				
Description: Multi function sound calibrator Signal generator	Model: B&K 4226 DS 360	Serial No. 2288444 61227	Expiry Date: 23-Aug-2022 31-Dec-2021		<b>Traceal</b> CIGISME CEPREI	
Ambient conditions						
Temperature: Relative humidity:	22 ± 1 °C 55 ± 10 % 1005 ± 5 hPa					

- 1, 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%.
- 3, The acoustic calibration was performed using an B&K 4226 sound calibrator and corrections was applied for the difference 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:** 06-Oct-2021 **Company Chop:** 0 Date: Feng Junqi

**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. The results apply to the item as received.

© Soils & Materials Engineering Co., Ltd.

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

HKAS has accredited this laboratory (Reg. No. HOKLAS 028) under HOKLAS for specific calibration activities as listed in the HOKLAS directory of accredited laboratories. The results shown in this certificate are traceable to the International System of Units (SI) or recognised measurement standards. The results relate only to the item(s) calibrated. This certificate shall not be reproduced except in full without approval of the laboratory.



### 綜合試驗有限公司 SOILS&MATERIALS ENGINEERING CO., LTD.

香港新界葵涌永基路22-24號好爸爸創科大廈



Good Ba Ba Hitech Building, Nos. 22-24 Wing Kei Road, Kwai Chung, New Territories, Hong Kong Tel: (852) 2873 6860 Fax: (852) 2555 7533 E-mail: smec@cigismec.com Website: www.cigismec.com

# **CERTIFICATE OF CALIBRATION**

(Continuation Page)

 Certificate No.:
 21CA0928 03-05
 Page
 2
 of
 2

#### 1, Electrical Tests

The electrical tests were perfomed 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	Α	Pass	0.3	
	С	Pass	0.8	2.1
	Lin	Pass	1.6	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	A	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 1/10 <sup>3</sup> at 4kHz	Pass	0.3	
	1 ms burst duty factor 1/10 <sup>4</sup> 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.

End Calibrated by: Checked by: Chan Yuk Yiu ina Chi Yip 06-Oct-2021 Date: 04 Oct-2021 Date:

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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Test Data for So	und Level Me	ter				Page 1 of 5
Sound level me	eter type:	AWA5661	Serial No.	301135	Date	04-Oct-2021
Microphone	type:	AWA14425	Serial No.	15338	Report	: 21CA0928 03-05

# SELF GENERATED NOISE TEST

The noise test is performed in the most sensitive range of the SLM with the microphone replaced by an equivalent impedance.

Noise level in A weighting	11.7	dB
Noise level in C weighting	12.5	dB
Noise level in Lin	16.7	dB

# LINEARITY TEST

The linearity is tested relative to the reference sound pressure level using a continuous sinusoidal signal of frequency 4 kHz. The measurement is made on the reference range for indications at 5 dB intervals starting from the 94 dB reference sound pressure level. And until within 5 dB of the upper and lower limits of the reference range, the measurements shall be made at 1 dB intervals.(SLM set to LEQ/SPL)

Reference/Expected level	Actua	l level	Tolerance	Devia	ation
Neierence/Expected level	non-integrated	integrated		non-integrated	integrated
dB	dB	dB	+/- dB	dB	dB
94.0	94.0	94.0	0.7	0.0	0.0
99.0	99.0	99.0	0.7	0.0	0.0
104.0	104.0	104.0	0.7	0.0	0.0
109.0	109.0	109.0	0.7	0.0	0.0
114.0	114.0	114.0	0.7	0.0	0.0
115.0	115.0	115.0	0.7	0.0	0.0
116.0	116.0	116.0	0.7	0.0	0.0
117.0	117.0	117.0	0.7	0.0	0.0
118.0	118.0	118.0	0.7	0.0	0.0
119.0	119.0	119.0	0.7	0.0	0.0
120.0	120.0	120.0	0.7	0.0	0.0
89.0	89.1	89.1	0.7	0.1	0.1
84.0	84.1	84.1	0.7	0.1	0.1
79.0	79.1	79.1	0.7	0.1	0.1
74.0	74.1	74.1	0.7	0.1	0.1
69.0	69.1	69.1	0.7	0.1	0.1
64.0	64.1	64.1	0.7	0.1	0.1
59.0	59.1	59.1	0.7	0.1	0.1
54.0	54.1	54.1	0.7	0.1	0.1
49.0	49.1	49.1	0.7	0.1	0.1
44.0	44.0	44.0	0.7	0.0	0.0
39.0	39.0	39.0	0.7	0.0	0.0
34.0	34.0	34.0	0.7	0.0	0.0
29.0	29.1	29.1	0.7	0.1	0.1
28.0	28.1	28.1	0.7	0.1	0.1

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Page 2 of 5

Test Data for Sound Level Meter

Sound level meter type: Microphone type:	AWA5661 AWA14425			301135 15338	Date	e 04-Oct-2	
27.0	27.1	27.1	0.7		0.1	0.1	
26.0	26.2	26.2	0.7		0.2	0.2	
25.0	25.3	25.3	0.7		0.3	0.3	

Measurements for an indication of the reference SPL on all other ranges which include it

Other ranges	Expected level	Actual level	Tolerance	Deviation
dB	dB	dB	+/- dB	dB
25-120	94.0	94.0	0.7	0.0
45-140	94.0	93.9	0.7	-0.1

Measurements on all level ranges for indications 2 dB below the upper limit and 2 dB above the lower limit

Ranges	Reference/Expected level	Actual level	Tolerance	Deviation
dB	dB	dB	+/- dB	dB
25-120	27.0	27.1	0.7	0.1
25-120	118.0	118.0	0.7	0.0
45 140	47.0	47.0	0.7	0.0
45-140	138.0	137.7	0.7	-0.3

# FREQUENCY WEIGHTING TEST

The frequency response of the weighting netwoks are tested at octave intervals over the frequency ranges 31.5 Hz to 12500 Hz. The signal level at 1000 Hz is set to give an indication of the reference SPL. Frequency weighting A:

Frequency	Ref. level	Expected level	Actual level	Tolerar	nce(dB)	Deviation
Hz	dB	dB	dB	+	-	dB
1000.0	94.0	94.0	94.0	0.0	0.0	0.0
31.6	94.0	54.6	54.3	1.5	1.5	-0.3
63.1	94.0	67.8	67.7	1.5	1.5	-0.1
125.9	94.0	77.9	77.8	1.0	1.0	-0.1
251.2	94.0	85.4	85.3	1.0	1.0	-0.1
501.2	94.0	90.8	90.7	1.0	1.0	-0.1
1995.0	94.0	95.2	95.2	1.0	1.0	0.0
3981.0	94.0	95.0	95.2	1.0	1.0	0.2
7943.0	94.0	92.9	93.5	1.5	3.0	0.6
12590.0	94.0	89.7	89.4	3.0	6.0	-0.3

Frequency weighting C:

requeries weigh	iting o.					
Frequency	Ref. level	Expected level	Actual level	Tolerance(dB)		Deviation
Hz	dB	dB	dB	+	-	dB
1000.0	94.0	94.0	94.0	0.0	0.0	0.0
31.6	94.0	91.0	90.8	1.5	1.5	-0.2
63.1	94.0	93.2	93.1	1.5	1.5	-0.1
125.9	94.0	93.8	93.8	1.0	1.0	0.0

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Page 3 of 5

Test Data for Sound Level Meter

Sound level mete Microphone		A5661 A14425	Serial No. Serial No.	301 153		Date 04-0 Report: 21C	Dct-2021 A0928 03-05
251.2	94.0	94.0	93.9	1.0	1.0	-0.1	
501.2	94.0	94.0	94.0	1.0	1.0	0.0	
1995.0	94.0	93.8	93.1	1.0	1.0	-0.7	
3981.0	94.0	93.2	93.4	1.0	1.0	0.2	
7943.0	94.0	91.0	91.6	1.5	3.0	0.6	
12590.0	94.0	87.8	87.5	3.0	6.0	-0.3	
Frequency weigh	nting Lin:						
Frequency	Ref. level	Expected level	Actual level	Tolerar	nce(dB)	Deviation	
Hz	dB	dB	dB	+	-	dB	
1000.0	94.0	94.0	94.0	0.0	0.0	0.0	
31.6	94.0	94.0	93.9	1.5	1.5	-0.1	
63.1	94.0	94.0	94.0	1.5	1.5	0.0	
125.9	94.0	94.0	94.0	1.0	1.0	0.0	
251.2	94.0	94.0	94.0	1.0	1.0	0.0	
501.2	94.0	94.0	94.0	1.0	1.0	0.0	
1995.0	94.0	94.0	94.0	1.0	1.0	0.0	
3981.0	94.0	94.0	94.0	1.0	1.0	0.0	
7943.0	94.0	94.0	94.0	1.5	3.0	0.0	
12590.0	94.0	94.0	93.9	3.0	6.0	-0.1	

# TIME WEIGHTING FAST TEST

Time weighting F is tested on the reference range with a single sinusoidal burst of duration 200 ms at a frequency 2000 Hz and an amplitude which produces an indication 4 dB below the upper limit of the primary indicator range when the signal is continuous. (Weight A, Maximum hold)

			T		
Ref. level	Expected level	Actual level	Tolerance(dB)		Deviation
dB	dB	dB	+	-	dB
116.0	115.0	115.0	1.0	1.0	0.0

## TIME WEIGHTING SLOW TEST

Time weighting S is tested on the reference range with a single sinusoidal burst of duration 500 ms at a frequency 2000 Hz and an amplitude which produces an indication 4 dB below the upper limit of the primary indicator range when the signal is continuous. (Weight A. Maximum hold)

5	1 0 1	/			
Ref. level	Expected level	Actual level	Tolerar	nce(dB)	Deviation
dB	dB	dB	+	-	dB
116.0	111.9	111.9	1.0	1.0	0.0

## PEAK RESPONSE TEST

The onset time of the peak detector is tested on the reference range by comparing the response to a 100 us rectangular test pulse with the response to a 10 ms reference pulse of the same amplitude. The amplitude of the 10 ms reference pulse is such as to produce an indication 1 dB below the upper limit of the primary indicator range. Positive polarities: (Weighting Z, set the generator signal to single, Lzpeak)

r ositive polarities.	(Weighting E, oet the gen	ierater eignar te en	igio, Espoury	
Ref. level	Response to 10 ms	Response to 100 us	Tolerance	Deviation

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Test Data for Sound Level Meter					Page 4 of 5
	WA5661 WA14425	Serial No. Serial No.	301135 15338	Date 04-0 Report: 21C	Oct-2021 A0928 03-05
dB	dB	dB	+/- dB	dB	
119.0	119.0	119.3	2.0	0.3	
Negative polarities:					
Ref. level	Response to 10 ms	Response to 100 us	Tolerance	Deviation	
dB	dB	dB	+/- dB	dB	
119.0	119.0	119.3	2.0	0.3	

## RMS ACCURACY TEST

The RMS detector accuracy is tested on the reference range for a crest factor of 3. 2000 Hz Test frequency: Amplitude: 2 dB below the upper limit of the primary indicator range. Burst repetition frequency: 40 Hz 11 cycles of a sine wave of frequency 2000 Hz. (Set to INT) Tone burst signal: Ref. Level Expected level Tone burst signal Tolerance Deviation indication(dB) +/- dB dB Time wighting dB dB Slow 116.0 115.8 0.5 -0.2 116.0+6.6

### TIME WEIGHTING IMPULSE TEST

Time weighting I is tested on the reference range(Set the SLM to LAImax)Test frequency:2000 HzAmplitude:The upper limit of the primary indicator range.Single sinusoidal burst of duration 5 ms:

Ref. Level	Single burs	t indication	Tolerance	Deviation
dB	Expected (dB)	Actual (dB)	+/- dB	dB
120.0	111.2	111.1	2.0	-0.1

Repeated at 100 Hz

Ref. Level	Repeated bu	irst indication	Tolerance	Deviation
dB	Expected (dB)	Actual (dB)	+/- dB	dB
120.0	117.3	117.1	1.0	-0.2

### TIME AVERAGING TEST

This test compares the SLM reading for continuous sine signals with readings obtained from a sine tone burst sequence having the same RMS level. The test level is 30 dB below the upper limit of the linearity range and repeated for Type 1 SLM with 40 dB below the upper limit of the linearity.

Frequency of tone burst: 4000 Hz

ricqueries of tone burst.	1000112	-				
Duration of tone burst:	1 ms					
Repetition Time	Level of	Expected	Actual	Tolerance	Deviation	Remarks
	tone burst	Leq	Leq			
msec	dB	dB	dB	+/- dB	dB	
1000	90.0	90.0	89.8	1.0	-0.2	60s integ.
10000	80.0	80.0	79.8	1.0	-0.2	6min. integ.

#### PULSE RANGE AND SOUND EXPOSURE LEVEL TEST

The test tone burst signal is superimposed on a baseline signal corresponding to the lower limit of reference range

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Test Data for Sour	nd Level Meter					Page 5 of 5
Sound level met Microphone		/A5661 /A14425	Serial No. Serial No.	301135 15338		Oct-2021 CA0928 03-05
Test frequency:	400	)0 Hz				
Integration time:	10	sec				
The integrating s	sound level meter	set to Leq:				_
Duration	Rms level of	Expected	Actual	Tolerance	Deviation	
msec	tone burst (dB)	dB	dB	+/- dB	dB	
10	90.0	60.0	59.8	1.7	-0.2	
The interveting of						

#### The integrating sound level meter set to SEL:

Duration	Rms level of	Expected	Actual	Tolerance	Deviation
msec	tone burst (dB)	dB	dB	+/- dB	dB
10.0	90.0	70.0	70.0	1.7	0.0

## OVERLOAD INDICATION TEST

For SLM capable of operating in a non-integrating mode.

I of or in oupdable	or operating in a	non integrating n	i cu ci		
Test frequer	ncy:	2000 Hz			
Amplitude:		2 dB below the u	pper limit of the p	primary indicator r	ange.
Burst repetit	ion frequency:	40 Hz			
Tone burst s	ignal:	11 cycles of a sir	ne wave of freque	ency 2000 Hz.	
Level	Level reduced by	Further reduced	Difference	Tolerance	Deviation
at overload (dB)	1 dB	3 dB	dB	dB	dB
115.6	114.6	111.6	3.0	1.0	0.0

For integrating SLM, with the instrument indicating Leq.

For integrating SLM, with the instrument indicating Leq and set to the reference range. The test signal as following:<br/>The test tone burst signal is superimposed on a baseline signal corresponding to the lower limit of reference range<br/>Test frequency:<br/>4000 Hz<br/>Integration time:4000 Hz

Single burst duration: 1 msec

Rms level	Level reduced by	Expected level	Actual level	Tolerance	Deviation
at overload (dB)	1 dB	dB	dB	dB	dB
121.9	120.9	80.9	80.7	2.2	-0.2

# ACOUSTIC TEST

The acoustic test of the complete SLM is tested at the frequency 125 Hz and 8000 Hz using a B&K type 4226 Multifunction Acoustic Calibrator. The test is performed in A weighting.

Frequency	Expected level	Actual level	Tolerar	nce (dB)	Deviation
Hz	dB	Measured (dB)	+	-	dB
1000	94.0	94.0	0.0	0.0	0.0
125	77.9	78.2	1.0	1.0	0.3
8000	92.9	93.6	1.5	3.0	0.7

-----END------

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# **CERTIFICATE OF CALIBRATION**

Certificate No.:	21CA0928 03-07		Page:	1 of	2
Item tested					
Description:	Acoustical Calibra	tor (Class 1)			
Manufacturer:	Quest				
Type/Model No.:	QC-10				
Serial/Equipment No.:	QI9010183				
Adaptors used:	-				
Item submitted by					
Curstomer:	Apex Testing & Ce	ertification Ltd.			
Address of Customer:		ML Tower, 3 Hoi Shing I	Road, Tsuen Wan, N.T.		
Request No.:	-	. 0	5 <b>1</b>		
Date of receipt:	28-Sep-2021				
Date of test:	05-Oct-2021				
Reference equipment		ration			
Reference equipment	used in the calib Model:	Serial No.	Expiry Date:	Tracea	ble to:
Reference equipment Description: Lab standard microphone	used in the calib Model: B&K 4180	<b>Serial No.</b> 2341427	04-May-2022	SCL	
Reference equipment Description: Lab standard microphone Preamplifier	used in the calib Model: B&K 4180 B&K 2673	Serial No. 2341427 2239857	04-May-2022 31-May-2022	SCL CEPRE	3
Reference equipment Description: Lab standard microphone Preamplifier Measuring amplifier	used in the calib Model: B&K 4180 B&K 2673 B&K 2610	Serial No. 2341427 2239857 2346941	04-May-2022 31-May-2022 01-Jun-2022	SCL CEPRE CEPRE	1
Reference equipment Description: Lab standard microphone Preamplifier Measuring amplifier Signal generator	used in the calib Model: B&K 4180 B&K 2673 B&K 2610 DS 360	Serial No. 2341427 2239857 2346941 33873	04-May-2022 31-May-2022 01-Jun-2022 27-May-2022	SCL CEPRE CEPRE CEPRE	] ] ]
Reference equipment Description: Lab standard microphone Preamplifier Measuring amplifier Signal generator Digital multi-meter	used in the calib Model: B&K 4180 B&K 2673 B&K 2610 DS 360 34401A	Serial No. 2341427 2239857 2346941 33873 US36087050	04-May-2022 31-May-2022 01-Jun-2022 27-May-2022 27-May-2022	SCL CEPRE CEPRE CEPRE CEPRE	:  :  :  :
Reference equipment Description: Lab standard microphone Preamplifier Measuring amplifier Signal generator Digital multi-meter Audio analyzer	used in the calib Model: B&K 4180 B&K 2673 B&K 2610 DS 360 34401A 8903B	Serial No. 2341427 2239857 2346941 33873 US36087050 GB41300350	04-May-2022 31-May-2022 01-Jun-2022 27-May-2022 27-May-2022 28-May-2022	SCL CEPRE CEPRE CEPRE CEPRE CEPRE	
Reference equipment	used in the calib Model: B&K 4180 B&K 2673 B&K 2610 DS 360 34401A	Serial No. 2341427 2239857 2346941 33873 US36087050	04-May-2022 31-May-2022 01-Jun-2022 27-May-2022 27-May-2022	SCL CEPRE CEPRE CEPRE CEPRE	1 1 1 1 1
Reference equipment Description: Lab standard microphone Preamplifier Measuring amplifier Signal generator Digital multi-meter Audio analyzer	used in the calib Model: B&K 4180 B&K 2673 B&K 2610 DS 360 34401A 8903B	Serial No. 2341427 2239857 2346941 33873 US36087050 GB41300350	04-May-2022 31-May-2022 01-Jun-2022 27-May-2022 27-May-2022 28-May-2022	SCL CEPRE CEPRE CEPRE CEPRE CEPRE	1 1 1 1 1
Reference equipment Description: Lab standard microphone Preamplifier Measuring amplifier Signal generator Digital multi-meter Audio analyzer Universal counter	used in the calib Model: B&K 4180 B&K 2673 B&K 2610 DS 360 34401A 8903B	Serial No. 2341427 2239857 2346941 33873 US36087050 GB41300350	04-May-2022 31-May-2022 01-Jun-2022 27-May-2022 27-May-2022 28-May-2022	SCL CEPRE CEPRE CEPRE CEPRE CEPRE	1 1 1 1 1
Reference equipment Description: Lab standard microphone Preamplifier Measuring amplifier Signal generator Digital multi-meter Audio analyzer Universal counter Ambient conditions	used in the calib Model: B&K 4180 B&K 2673 B&K 2610 DS 360 34401A 8903B 53132A	Serial No. 2341427 2239857 2346941 33873 US36087050 GB41300350	04-May-2022 31-May-2022 01-Jun-2022 27-May-2022 27-May-2022 28-May-2022	SCL CEPRE CEPRE CEPRE CEPRE CEPRE	1 1 1 1 1

#### **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 me	easurements/are prese	ented on pag	e 2 of this certifica	ite.	SUNS ENGINEERIE
Approved Signatory:	Feng Junqi	Date:	05-Oct-2021	Company Chop:	综合試驗 有限公司 STOS * TOL

**Comments:** The results reported in this certificate refer to the conditon of the instrument on the date of calibration and carry no implication regarding the long-term stability of the instrument. The results apply to the item as received.

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

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21CA0928 03-07

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# **CERTIFICATE OF CALIBRATION**

(Continuation Page)

Certificate No.:

Page:

2 of 2

#### 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	Output Sound Pressure	Measured Output	Estimated Expanded
Shown	Level Setting	Sound Pressure Level	Uncertainty
Hz	dB	dB	dB
1000	114.00	114.00	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 = 0.012 dB

Estimated expanded uncertainty

#### 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:

0.005 dB

At 1000 Hz	Actual Frequency = 1003.1 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 = 0.2 %
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.

L	1 /	-	End -	11
Calibrated by:	$1 \sim 1$		Checked by:	Jack
	Fung Chi Yip			Chan Yuk Yiu
Date:	05-Oct-2021		Date:	05-Oct-2021

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

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