

RECALIBRATION

DUE DATE:

November 2, 2021

Certificate of Calibration

			Calibration	Certificati	on Informat	tion	•••••••••••••••••••••••••••••••••••••••	
Cal. Date:	November	2, 2020	Roots	meter S/N:	438320	Ta:	Ta: 294	
Operator:	Jim Tisch					Pa: 756.7		mm Hg
Calibration	Model #:	TE-5025A	Calil	orator S/N:	3543			-
	<b></b>		Mal Plant				···	1
	Run	Vol. Init (m3)	Vol. Final	ΔVol. (m2)	ΔTime (min)			
	<u></u> 1	1	<b>(m3)</b> 2	(m3) 1	(min) 1.4310	(mm Hg) 3.2	(in H2O) 2.00	
	2	3	4	1	1.0110	6.4	4.00	
	3	5	6	1	0.9000	8.0	5.00	
	4	7	8	1	0.8560	8.9	5.50	
	5	9	10	1	0.7100	12.9	8.00	
				Data Tabula	tion			
	Vstd	Qstd	$\sqrt{\Delta H \left(\frac{Pa}{Pstd}\right)}$	)( <u>Tstd</u> ) Ta)		0.5	√∆Н( Та/Ра)	
	(m3)	(x-axis)	y (Yeta (y-ax)		Va	Qa (x-axis)	• • •	
	1.0049	0.7022	1.420		0.9958	0.6959	(y-axis) 0.8815	
	1.0006	0.9897	2,009		0.9915	0.9808	1.2467	
	0.9985	1.1094	2,246	53	0.9894	1.0994	1.3938	
	0.9973	1.1651	2.355	59	0.9882	1.1545	1.4619	
	0.9920	1.3971	2.841	.4	0.9830	1.3844	1.7631	
		m=	2.039		_	m=	1.27701	
	QSTD	b=	-0.012		QA	b≃	-0.00805	
		r=	0.999	95		r=	0.99995	
				Calculatio				
			/Pstd)(Tstd/Ta					
	Qstd=	Vstd/∆Time				Va/∆Time		
		·····	For subsequ	ent flow rat	te calculation	ns:		
	Qstd=	1/m(( √∆H(·	Pa <u>Tstd</u> Pstd Ta	)-b)	Qa=	1/m ((√∆H	(Та/Ра))-ь)	
		Conditions						
Tstd:	298.15			[		RECA	IBRATION	
Pstd:		mm Hg			LIS EPA reco	mmends ar	nual recalibratio	n ner 1000
H: calibrate		er reading (ir	H20)		US EPA recommends annual recalibration per 1998 40 Code of Federal Regulations Part 50 to 51,			
		eter reading (i					Reference Meth	
		perature (°K)					ended Particulate	
Pa: actual ba		essure (mm l	⊣g)				re, 9.2.17, page 3	
o: intercept				L				
n: slope								

Tisch Environmental, Inc.

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			Site Ir	nformation			
	Location: AM3A Sampler: TE-5170		Zones 2A at West Site ID: Kowloon Cultural Serial No: 4340			Date: 30-Jun-21 Tech: CS Tang	
			Site C	Conditions			
В	Barometric Pressure (in Hg): 29.7 Temperature (deg F): 86 Average Press. (in Hg): 29.7 Average Temp. (deg F): 86				Tempe Corrected Ave	Corrected Pressure (mm Hg): 755 Temperature (deg K): 303 Corrected Average (mm Hg): 755 Average Temp. (deg K): <sup>303</sup>	
			Calibra	tion Orifice			
	Make: 5 Model: 5 Serial#: 5	<b>TE-5025A</b>			Qstd Slope: 2 Qstd Intercept: - Date Certified: 2	-0.01298	
			Calibratic	n Informatic	n		
Plate or Test # 2 3 4 5	H2O (in) 12.40 10.60 7.10 4.50 2.60	Qstd (m3/min) 1.712 1.584 1.297 1.034 0.788	I (chart) 53.0 48.0 41.0 33.0 23.0	IC (corrected) 52.37 47.43 40.51 32.61 22.73	# o:	Linear Regression Slope: 30.8186 Intercept: -0.4148 Corr. Coeff: 0.9960	
Qstd = 1/m[Sqrt(H2C IC = I[Sqrt(Pa/Pstd)(' Qstd = standard flow IC = corrected chart r I = actual chart respo	Tstd/Ta)] rate response	td/Ta))-b]	Ca	lculations	m = sampler slop b = sampler inter I = chart respons Tav = daily averag Pav = daily averag	rcept se ge temperature	
1 = actual chart respo m = calibrator Qstd is b = calibrator Qstd is Ta = actual temperatu Pa = actual pressure of Tstd = 298 deg K Pstd = 760 mm Hg For subsequent calcu 1/m((I)[Sqrt(298/Tav	slope ntercept ure during cal during calibra lation of sam	tion (mm Hg) pler flow:			Averag Averag Samı	verage I (chart): 40 e Flow Calculation m3/min 1.283036231 e Flow Calculation in CFM 45.30400931 ple Time (Hrs): 1.0 Total Flow in m3/min 76.98217384 Total Flow in CFM 2718.240558	



			Site li	nformation		
Location: 2	ΔΜ3Δ		Site ID:	Zones 2A a Kowloon Cu		Date: 28-Aug-21
Sampler:			Serial No:			Tech: CS Tang
	Barometric Dr	essure (in Hg): 2		Conditions	Corrected Press	sure (mm Hg): 759
		erature (deg F): 8				rature (deg K): 300
		Press. (in Hg): 2			-	rage (mm Hg): 759
		Temp. (deg F): 8				Cemp. (deg K): 300
			Calibra	tion Orifice		
	Make:	Tisch			Qstd Slope: 2	.03936
		TE-5025A			Qstd Intercept: -	
	Serial#:	3543			Date Certified: 2	-Nov-20
			Calibratio	on Informatic	n	
Plate or	H2O	Qstd	Ι	IC		
Test #	(in)	(m3/min)	(chart)	(corrected)		Linear Regression
1	12.50	1.733	53.0	52.79		Slope: 32.1441
2	10.30	1.574	48.0	47.81		Intercept: -2.4258
3	7.20	1.317	41.0	40.83		Corr. Coeff: 0.9968
			22.0			
4	4.70	1.065	33.0 23.0	32.87 22.91	# of	
			23.0	22.91	# of	Observations: 5
4 5	4.70 2.80	1.065 0.824	23.0			Observations: 5
4 5 td = 1/m[Sqrt()	4 . 70 2 . 80 H2O(Pa/Pstd)(Ts	1.065 0.824	23.0	22.91	m = sampler slop	Observations: 5
4 5 td = 1/m[Sqrt()	4 . 70 2 . 80 H2O(Pa/Pstd)(Ts	1.065 0.824	23.0	22.91	m = sampler slop b = sampler inter	Observations: 5
4 5 id = 1/m[Sqrt() = I[Sqrt(Pa/Ps	4.70 2.80 H2O(Pa/Pstd)(Ts td)(Tstd/Ta)]	1.065 0.824	23.0	22.91	m = sampler slop b = sampler inter I = chart response	<b>Cobservations:</b> 5
4 5 td = 1/m[Sqrt() = I[Sqrt(Pa/Ps td = standard f	4.70 2.80 H2O(Pa/Pstd)(Ts td)(Tstd/Ta)] low rate	1.065 0.824	23.0	22.91	m = sampler slop b = sampler inter	• Observations: 5 • oe cept • e ge temperature
4 5 d = 1/m[Sqrt() = I[Sqrt(Pa/Ps d = standard f = corrected ch	4.70 2.80 H2O(Pa/Pstd)(Ts ttd)(Tstd/Ta)] flow rate nart response	1.065 0.824	23.0	22.91	m = sampler slop b = sampler inter I = chart respons Tav = daily averag	• Observations: 5 • oe cept • e ge temperature
4 5 td = 1/m[Sqrt() = I[Sqrt(Pa/Ps td = standard f = corrected ch actual chart re	4.70 2.80 H2O(Pa/Pstd)(Ts std)(Tstd/Ta)] Now rate hart response esponse	1.065 0.824	23.0	22.91	m = sampler slop b = sampler inter I = chart respons Tav = daily averag Pav = daily averag	Observations: 5
4 5 td = 1/m[Sqrt() = I[Sqrt(Pa/Ps td = standard f = corrected ch actual chart re = calibrator Q	4.70 2.80 H2O(Pa/Pstd)(Ts std)(Tstd/Ta)] low rate hart response esponse lstd slope	1.065 0.824	23.0	22.91	m = sampler slop b = sampler inter I = chart respons Tav = daily averag Pav = daily averag Ave	<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 = calibrator Qs	4.70 2.80 H2O(Pa/Pstd)(Ts std)(Tstd/Ta)] low rate hart response esponse lstd slope	1.065 0.824 std/Ta))-b]	23.0	22.91	m = sampler slop b = sampler inter I = chart response Tav = daily averag Pav = daily averag Average	Cobservations: 5 be cept e ge temperature te pressure erage I (chart): 40 e Flow Calculation m3/min 1.302458551
4 5 td = 1/m[Sqrt() = I[Sqrt(Pa/Ps td = standard f = corrected ch actual chart re = calibrator Q = calibrator Qs = actual tempe	4.70 2.80 H2O(Pa/Pstd)(Ts td)(Tstd/Ta)] low rate esponse esponse std slope std intercept	1.065 0.824 atd/Ta))-b] libration (deg K)	23.0	22.91	m = sampler slop b = sampler inter I = chart response Tav = daily averag Pav = daily average Average Average	Cobservations: 5  Cobservatio
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 pressu	4.70 2.80 H2O(Pa/Pstd)(Ts atd)(Tstd/Ta)] Now rate hart response esponse std slope std slope std slope std intercept erature during ca ure during calibra	1.065 0.824 atd/Ta))-b] libration (deg K)	23.0	22.91	m = sampler slop b = sampler inter I = chart response Tav = daily averag Pav = daily average Average Average	Cobservations: 5 be cept e ge temperature te pressure erage I (chart): 40 e Flow Calculation m3/min 1.302458551
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 d = 298 deg K d = 760 mm H	4.70 2.80 H2O(Pa/Pstd)(Ts std)(Tstd/Ta)] flow rate hart response esponse estd slope std slope std intercept erature during calibra G	1.065 0.824 atd/Ta))-b] libration (deg K) ation (mm Hg)	23.0	22.91	m = sampler slop b = sampler inter I = chart respons Tav = daily averag Pav = daily averag Average Average	Cobservations: 5  Cobservatio
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 r subsequent ca	4.70 2.80 H2O(Pa/Pstd)(Ts std)(Tstd/Ta)] flow rate hart response esponse lstd slope std intercept erature during calibra L Ig alculation of sam	1.065 0.824 atd/Ta))-b] libration (deg K) ation (mm Hg) pler flow:	23.0	22.91	m = sampler slop b = sampler inter I = chart respons Tav = daily averag Pav = daily averag Average Average Samp	Cobservations: 5  Percept e ge temperature terage I (chart): 40 e Flow Calculation m3/min 1.302458551 e Flow Calculation in CFM 45.98981142 de Time (Hrs): 1.0 otal Flow in m3/min
4 5 td = 1/m[Sqrt() = I[Sqrt(Pa/Ps td = standard f = corrected ch = catual chart re = calibrator Q = calibrator Qs = actual tempe = actual press td = 298 deg K td = 760 mm H r subsequent ca	4.70 2.80 H2O(Pa/Pstd)(Ts std)(Tstd/Ta)] flow rate hart response esponse estd slope std slope std intercept erature during calibra G	1.065 0.824 atd/Ta))-b] libration (deg K) ation (mm Hg) pler flow:	23.0	22.91	m = sampler slop b = sampler inter I = chart respons Tav = daily averag Pav = daily averag Average Average Samp T	Cobservations: 5  Percept e ge temperature terage I (chart): 40 e Flow Calculation m3/min 1.302458551 e Flow Calculation in CFM 45.98981142 ble Time (Hrs): 1.0 otal Flow in m3/min 78.14751303
4 5 std = 1/m[Sqrt(0 = I[Sqrt(Pa/Ps std = standard f = corrected ch = actual chart re = calibrator Q = calibrator Qs = actual tempe = actual pressu td = 298 deg K td = 760 mm H or subsequent ca	4.70 2.80 H2O(Pa/Pstd)(Ts std)(Tstd/Ta)] flow rate hart response esponse lstd slope std intercept erature during calibra t lg alculation of sam	1.065 0.824 atd/Ta))-b] libration (deg K) ation (mm Hg) pler flow:	23.0	22.91	m = sampler slop b = sampler inter I = chart respons Tav = daily averag Pav = daily averag Average Average Samp T	Cobservations: 5  Percept e ge temperature terage I (chart): 40 e Flow Calculation m3/min 1.302458551 e Flow Calculation in CFM 45.98981142 de Time (Hrs): 1.0 otal Flow in m3/min



			Site li	nformation	
Location: AM4A Sampler: TE-5170		Site ID: Serial No:	Zones 2A a Kowloon Cu 3998		
			Site (	Conditions	
	Barometric Pre	essure (in Hg): 2		Jonardione	Corrected Pressure (mm Hg): 755
		erature (deg F): 8			Temperature (deg K): 303
	Average	Press. (in Hg): 2	9.71		Corrected Average (mm Hg): 755
	Average	Temp. (deg F): <sup>8</sup>	6		Average Temp. (deg K): 303
			Calibra	tion Orifice	
	Make: 5	Tisch			Qstd Slope: 2.03936
		TE-5025A			Qstd Intercept: -0.01298
	Serial#:	3543			Date Certified: 2-Nov-20
			Calibratio	on Informatic	n
Plate or	H2O	Qstd	I	IC	
Test #	(in)	(m3/min)	(chart)	(corrected)	Linear Regression
1	12.30	1.706	53.0	52.37	Slope: 30.5487
2 3	10.50	1.576	48.0	47.43	Intercept: 0.0717 Corr. Coeff: 0.9970
3	7.30	1.315	41.0	40.51	
	4 4 0	1 0 2 2	33 0	22 61	
4	4.40 2.50	1.023 0.772	33.0 23.0	32.61 22.73	
4	4.40 2.50	1.023 0.772	23.0	22.73	# of Observations: 5
4 5	2.50	0.772	23.0		# of Observations: 5
4 5 td = 1/m[Sqrt(	2.50 (H2O(Pa/Pstd)(Ts	0.772	23.0	22.73	<b># of Observations:</b> 5 m = sampler slope
4 5 d = 1/m[Sqrt(	2.50 (H2O(Pa/Pstd)(Ts	0.772	23.0	22.73	<pre># of Observations: 5 m = sampler slope b = sampler intercept</pre>
4 5 d = 1/m[Sqrt( = I[Sqrt(Pa/Ps	2.50 H2O(Pa/Pstd)(Ts std)(Tstd/Ta)]	0.772	23.0	22.73	<pre># of Observations: 5 m = sampler slope b = sampler intercept I = chart response</pre>
4 5 d = 1/m[Sqrt( = I[Sqrt(Pa/Ps d = standard f	2.50 H2O(Pa/Pstd)(Ts std)(Tstd/Ta)] flow rate	0.772	23.0	22.73	<pre># of Observations: 5 m = sampler slope b = sampler intercept I = chart response Tav = daily average temperature</pre>
4 5 td = 1/m[Sqrt( = I[Sqrt(Pa/Ps td = standard f = corrected ch	2.50 H2O(Pa/Pstd)(Ts std)(Tstd/Ta)] flow rate nart response	0.772	23.0	22.73	<pre># of Observations: 5 m = sampler slope b = sampler intercept I = chart response</pre>
4 5 td = 1/m[Sqrt( = I[Sqrt(Pa/Ps td = standard f = corrected ch actual chart re	2.50 (H2O(Pa/Pstd)(Ts std)(Tstd/Ta)] flow rate hart response esponse	0.772	23.0	22.73	<pre># of Observations: 5 m = sampler slope b = sampler intercept I = chart response Tav = daily average temperature</pre>
4 5 d = 1/m[Sqrt( = I[Sqrt(Pa/Ps d = standard f = corrected ch actual chart re = calibrator Q	2.50 (H2O(Pa/Pstd)(Ts std)(Tstd/Ta)] flow rate hart response esponse lstd slope	0.772	23.0	22.73	<pre># of Observations: 5 m = sampler slope b = sampler intercept I = chart response Tav = daily average temperature Pav = daily average pressure</pre>
4 5 d = 1/m[Sqrt( = I[Sqrt(Pa/Ps d = standard f = corrected ch actual chart re = calibrator Q = calibrator Qs	2.50 (H2O(Pa/Pstd)(Ts std)(Tstd/Ta)] flow rate hart response esponse lstd slope	0.772 std/Ta))-b]	23.0	22.73	# of Observations: 5 m = sampler slope b = sampler intercept I = chart response Tav = daily average temperature Pav = daily average pressure Average I (chart): 40
4 5 d = 1/m[Sqrt( = I[Sqrt(Pa/Ps d = standard f = corrected ch actual chart re = calibrator Q = calibrator Q = actual tempe = actual presse	2.50 (H2O(Pa/Pstd)(Ts std)(Tstd/Ta)] flow rate hart response esponse ostd slope std slope std intercept erature during calibra	0.772 std/Ta))-b] libration (deg K)	23.0	22.73	# of Observations: 5 m = sampler slope b = sampler intercept I = chart response Tav = daily average temperature Pav = daily average pressure Average I (chart): 40 Average Flow Calculation m3/min
4 5 d = 1/m[Sqrt( = I[Sqrt(Pa/Ps d = standard f = corrected ch actual chart re = calibrator Q = calibrator Q = actual tempe = actual press	2.50 (H2O(Pa/Pstd)(Ts std)(Tstd/Ta)] flow rate hart response esponse ostd slope std slope std intercept erature during calibra	0.772 std/Ta))-b] libration (deg K)	23.0	22.73	# of Observations: 5 m = sampler slope b = sampler intercept I = chart response Tav = daily average temperature Pav = daily average pressure Average I (chart): 40 Average Flow Calculation m3/min 1.278446367
4 5 d = 1/m[Sqrt( = I[Sqrt(Pa/Ps d = standard f = corrected ch actual chart re = calibrator Q = calibrator Q = actual tempo = actual pressi d = 298 deg K d = 760 mm H	2.50 (H2O(Pa/Pstd)(Ts std)(Tstd/Ta)] flow rate hart response esponse 0std slope std slope std intercept erature during calibra K Ig	0.772 atd/Ta))-b] libration (deg K) ation (mm Hg)	23.0	22.73	<pre># of Observations: 5 m = sampler slope b = sampler intercept I = chart response Tav = daily average temperature Pav = daily average pressure Average I (chart): 40 Average Flow Calculation m3/min 1.278446367 Average Flow Calculation in CFM 45.14194122 Sample Time (Hrs): 1.0</pre>
4 5 d = 1/m[Sqrt( = I[Sqrt(Pa/Ps d = standard f = corrected ch actual chart re = calibrator Q = calibrator Q = actual temp = actual press d = 298 deg K d = 760 mm H	2.50 (H2O(Pa/Pstd)(Ts std)(Tstd/Ta)] flow rate hart response esponse std slope std slope std intercept erature during calibra G Ig alculation of sam	0.772 atd/Ta))-b] libration (deg K) ation (mm Hg) pler flow:	23.0	22.73	<pre># of Observations: 5 m = sampler slope b = sampler intercept I = chart response Tav = daily average temperature Pav = daily average pressure Average I (chart): 40 Average Flow Calculation m3/min 1.278446367 Average Flow Calculation in CFM 45.14194122 Sample Time (Hrs): 1.0 Total Flow in m3/min</pre>
4 5 td = 1/m[Sqrt( = I[Sqrt(Pa/Ps td = standard f = corrected ch actual chart re = calibrator Q = calibrator Q = actual temp = actual press td = 298 deg K d = 760 mm H r subsequent ca	2.50 (H2O(Pa/Pstd)(Ts std)(Tstd/Ta)] flow rate hart response esponse 0std slope std slope std intercept erature during calibra K Ig	0.772 atd/Ta))-b] libration (deg K) ation (mm Hg) pler flow:	23.0	22.73	<pre># of Observations: 5 m = sampler slope b = sampler intercept I = chart response Tav = daily average temperature Pav = daily average pressure Average I (chart): 40 Average Flow Calculation m3/min</pre>
4 5 td = 1/m[Sqrt( = I[Sqrt(Pa/Ps td = standard f = corrected ch actual chart re = calibrator Q = calibrator Q = actual temp = actual press td = 298 deg K cd = 760 mm H r subsequent ca	2.50 (H2O(Pa/Pstd)(Ts std)(Tstd/Ta)] flow rate hart response esponse std slope std slope std intercept erature during calibra G Ig alculation of sam	0.772 atd/Ta))-b] libration (deg K) ation (mm Hg) pler flow:	23.0	22.73	<pre># of Observations: 5 m = sampler slope b = sampler intercept I = chart response Tav = daily average temperature Pav = daily average pressure Average I (chart): 40 Average Flow Calculation m3/min 1.278446367 Average Flow Calculation in CFM 45.14194122 Sample Time (Hrs): 1.0 Total Flow in m3/min</pre>



	Site I	nformation		
Location: AM4A Sampler: TE-5170		Zones 2A at West Site ID: Kowloon Cultural Serial No: 3998		Date: 28-Aug-21 Tech: CS Tang
	Site (	Conditions		
Barometric Pressure (in Hg): 2 Temperature (deg F): 8 Average Press. (in Hg): 2 Average Temp. (deg F): 8	0 9.87		Temper Corrected Aver	sure (mm Hg): 759 rature (deg K): 300 age (mm Hg): 759 Yemp. (deg K): <sup>300</sup>
	Calibra	tion Orifice		
Make: Tisch Model: TE-5025A Serial#: 3543			Qstd Slope: 2 Qstd Intercept: - Date Certified: 2	0.01298
	Calibratio	n Informatic	n	
Plate or         H2O         Qstd           Test #         (in)         (m3/min)           1         12.60         1.740           2         10.60         1.596           3         7.40         1.335           4         4.50         1.042           5         2.60         0.794	I (chart) 53.0 48.0 41.0 33.0 23.0	IC (corrected) 52.79 47.81 40.83 32.87 22.91	# of	Linear Regression Slope: 30.5068 Intercept: -0.2636 Corr. Coeff: 0.9970
	Ca	alculations		
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			<ul> <li>m = sampler slop</li> <li>b = sampler interview</li> <li>I = chart response</li> <li>Tav = daily averag</li> <li>Pav = daily averag</li> </ul>	cept e ge temperature ge pressure
<ul> <li>m = calibrator Qstd slope</li> <li>b = calibrator Qstd intercept</li> <li>Ta = actual temperature during calibration (deg K)</li> <li>Pa = actual pressure during calibration (mm Hg)</li> <li>Tstd = 298 deg K</li> <li>Pstd = 760 mm Hg</li> <li>For subsequent calculation of sampler flow:</li> <li>1/m((I)[Sqrt(298/Tav)(Pav/760)]-b)</li> </ul> NOTE: Ensure calibration orifice has been certified			Average Average Samp To	erage I (chart): 40 Flow Calculation m3/min 1.301485004 Flow Calculation in CFM 45.9554355 le Time (Hrs): 1.0 otal Flow in m3/min 78.08910026 Total Flow in CFM 2757.32613



			Site Ir	nformation		
Location: AM5A Sampler: TE-5170		Zones 2A at West Site ID: Kowloon Cultural Serial No: 4344			Date: 30-Jun-21 Tech: CS Tang	
			Site (	Conditions		
	Barometric Pre	essure (in Hg): 2			Corrected Pressu	re (mm Hg): 755
	Tempe	rature (deg F): 8	6		Temperat	ure (deg K): 303
	Average	Press. (in Hg): 2	9.71		Corrected Average	<b>ge (mm Hg):</b> 755
	Average	Femp. (deg F): 8	6		Average Ter	<b>mp. (deg K):</b> <sup>303</sup>
			Calibra	tion Orifice		
	Make: 5				Qstd Slope: 2.	
		FE-5025A			Qstd Intercept: -0	
	Serial#:	3543			Date Certified: 2-	11-2020
			Calibratic	n Informatic	n	
Plate or	H2O	Qstd	I	IC		
Test #	(in)	(m3/min)	(chart)	(corrected)		Linear Regression
1	12.20	1.699	53.0	52.37		Slope: 32.8579
2	10.30	1.561	48.0	47.43		Intercept: -3.3912 Corr. Coeff: 0.9961
3	7.50	1.333	41.0	40.51		Con. Coell: 0.9961
4	4.60	1.045	33.0	32.61		
5	2.90	0.831	23.0	22.73	# of C	bservations: 5
	2.90	0.831	23.0		# of C	Observations: 5
5				alculations		Observations: 5
5 td = 1/m[Sqrt(2	H2O(Pa/Pstd)(Ts				m = sampler slope	
5 td = 1/m[Sqrt(2	H2O(Pa/Pstd)(Ts				m = sampler slope b = sampler interce	
5 d = 1/m[Sqrt( = I[Sqrt(Pa/Ps	H2O(Pa/Pstd)(Ts std)(Tstd/Ta)]				m = sampler slope b = sampler interce I = chart response	pt
5 d = 1/m[Sqrt() = I[Sqrt(Pa/Ps d = standard f	H2O(Pa/Pstd)(Ts std)(Tstd/Ta)] flow rate				m = sampler slope b = sampler interce	pt temperature
5 td = 1/m[Sqrt() = I[Sqrt(Pa/Ps td = standard f = corrected ch	H2O(Pa/Pstd)(Ts std)(Tstd/Ta)] flow rate nart response				<ul> <li>m = sampler slope</li> <li>b = sampler interce</li> <li>I = chart response</li> <li>Tav = daily average</li> </ul>	pt temperature
5 td = 1/m[Sqrt() = I[Sqrt(Pa/Ps td = standard f = corrected ch actual chart re	H2O(Pa/Pstd)(Ts std)(Tstd/Ta)] flow rate nart response esponse				<ul> <li>m = sampler slope</li> <li>b = sampler interce</li> <li>I = chart response</li> <li>Tav = daily average</li> <li>Pav = daily average</li> </ul>	pt temperature
5 id = 1/m[Sqrt() = I[Sqrt(Pa/Ps id = standard f = corrected ch actual chart re = calibrator Q	H2O(Pa/Pstd)(Ts std)(Tstd/Ta)] flow rate nart response esponse lstd slope				m = sampler slope b = sampler interce I = chart response Tav = daily average Pav = daily average Avera	pt temperature pressure
5 td = 1/m[Sqrt() = I[Sqrt(Pa/Ps td = standard f = corrected ch actual chart re = calibrator Q = calibrator Qs	H2O(Pa/Pstd)(Ts std)(Tstd/Ta)] flow rate nart response esponse lstd slope	td/Ta))-b]			m = sampler slope b = sampler interce I = chart response Tav = daily average Pav = daily average Avera	pt temperature pressure <b>age I (chart):</b> 40
5 td = 1/m[Sqrt() = I[Sqrt(Pa/Ps td = standard f = corrected ch actual chart re = calibrator Q = calibrator Q = actual tempo = actual presso	H2O(Pa/Pstd)(Ts std)(Tstd/Ta)] flow rate hart response esponse std slope std slope std intercept erature during calibra	td/Ta))-b] ibration (deg K)			m = sampler slope b = sampler interce I = chart response Tav = daily average Pav = daily average Average F	pt temperature pressure age I (chart): 40 Tow Calculation m3/min
5 d = 1/m[Sqrt() = I[Sqrt(Pa/Ps d = standard f = corrected ch actual chart re = calibrator Q = calibrator Q = actual tempo = actual presso	H2O(Pa/Pstd)(Ts std)(Tstd/Ta)] flow rate hart response esponse std slope std slope std intercept erature during calibra	td/Ta))-b] ibration (deg K)			m = sampler slope b = sampler interce I = chart response Tav = daily average Pav = daily average Average H Average H	pt temperature pressure age I (chart): 40 Plow Calculation m3/min 1.293989693
5 d = 1/m[Sqrt( = I[Sqrt(Pa/Ps d = standard f = corrected ch actual chart re = calibrator Q = calibrator Q = actual tempo = actual presso d = 298 deg K d = 760 mm H	H2O(Pa/Pstd)(Ts std)(Tstd/Ta)] flow rate hart response esponse std slope std slope std intercept erature during calibra t g	td/Ta))-b] ibration (deg K) ition (mm Hg)			m = sampler slope b = sampler interce I = chart response Tav = daily average Pav = daily average Average F Average F	pt temperature pressure age I (chart): 40 Flow Calculation m3/min 1.293989693 Flow Calculation in CFM
5 id = 1/m[Sqrt() = I[Sqrt(Pa/Ps id = standard f = corrected ch actual chart re = calibrator Q = calibrator Qs = actual tempe = actual presses d = 298 deg K d = 760 mm H	H2O(Pa/Pstd)(Ts std)(Tstd/Ta)] flow rate aart response esponse estd slope std slope std intercept erature during calibra G Ig alculation of sam	td/Ta))-b] ibration (deg K) ation (mm Hg) pler flow:			m = sampler slope b = sampler interce I = chart response Tav = daily average Pav = daily average Average F Average F Average F Sample	ept temperature pressure age I (chart): 40 Flow Calculation m3/min 1.293989693 Flow Calculation in CFM 45.69077607 Time (Hrs): 1.0 al Flow in m3/min
5 td = 1/m[Sqrt() = I[Sqrt(Pa/Ps td = standard f = corrected ch actual chart re = calibrator Q = calibrator Q = actual tempo = actual press td = 298 deg K d = 760 mm H r subsequent ca	H2O(Pa/Pstd)(Ts std)(Tstd/Ta)] flow rate hart response esponse std slope std slope std intercept erature during calibra t g	td/Ta))-b] ibration (deg K) ation (mm Hg) pler flow:			m = sampler slope b = sampler interce I = chart response Tav = daily average Pav = daily average Average Average F Average F Sample Tot	temperature pressure age I (chart): 40 Plow Calculation m3/min 1.293989693 Flow Calculation in CFM 45.69077607 Time (Hrs): 1.0 al Flow in m3/min 77.6393816
5 td = 1/m[Sqrt() = I[Sqrt(Pa/Ps td = standard f = corrected ch actual chart re = calibrator Q = calibrator Q = actual tempo = actual press td = 298 deg K d = 760 mm H r subsequent ca	H2O(Pa/Pstd)(Ts std)(Tstd/Ta)] flow rate aart response esponse estd slope std slope std intercept erature during calibra G Ig alculation of sam	td/Ta))-b] ibration (deg K) ation (mm Hg) pler flow:			m = sampler slope b = sampler interce I = chart response Tav = daily average Pav = daily average Average Average F Average F Sample Tot	ept temperature pressure age I (chart): 40 Flow Calculation m3/min 1.293989693 Flow Calculation in CFM 45.69077607 Time (Hrs): 1.0 al Flow in m3/min



			Site Ir	nformation		
Location: A Sampler: T				Zones 2A a Kowloon Cu 4344		Date: 28-Aug-21 Tech: CS Tang
•			Site (	Conditions		
	Barometric Pre	essure (in Hg): 2		Jonardons	Corrected Pre	ssure (mm Hg): 759
		erature (deg F): 8				erature (deg K): 300
	Average	Press. (in Hg): 2	9.87		Corrected Ave	erage (mm Hg): 759
	Average	Temp. (deg F): <sup>8</sup>	0		Average	Temp. (deg K): 300
			Calibra	tion Orifice		
	Make:				Qstd Slope:	
		TE-5025A			Qstd Intercept:	
	Serial#:	3543			Date Certified:	2-Nov-20
				n Informatic	n	
Plate or	H2O	Qstd	I	IC		
Test #	(in)	(m3/min)	(chart)	(corrected)		Linear Regression
1	12.40	1.726	53.0	52.79		Slope: 30.6738
2 3	10.20 7.60	1.566 1.353	48.0 41.0	47.81 40.83		Intercept: -0.1550 Corr. Coeff: 0.9974
4	4.40	1.031	33.0	32.87		
5	2.50	0.779	23.0	22.91	# (	of Observations: 5
			Ca	alculations		
std = 1/m[Sqrt(H	I2O(Pa/Pstd)(Ts	td/Ta))-b]			m = sampler slo	ope
= I[Sqrt(Pa/Psto	d)(Tstd/Ta)]				b = sampler inte	ercept
					I = chart respon	se
td = standard flo	ow rate				Tav = daily avera	age temperature
= corrected cha	rt response				Pav = daily avera	age pressure
actual chart res	-					
= calibrator Qs						verage I (chart): 40
= calibrator Qst					Averag	ge Flow Calculation m3/min
		libration (deg K)				1.290857523
= actual pressuretd $200 dec V$	-	ation (mm Hg)			Averag	ge Flow Calculation in CFM
td = 298 deg K					Gam	45.58017915
td = 760 mm Hg r subsequent cal		pler flow:				nple Time (Hrs): 1.0 Total Flow in m3/min
n((I)[Sqrt(298/T						77.45145141
(1)[0411(270/1		<i>)</i> ,				Total Flow in CFM
OTE: Ensure cal	ibration orifice	has been certified	within 12 mont	ths of use	<u> </u>	2734.810749



# **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 October 19, 2020

Expiration Date December 1, 2021



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

www.aqtlgroup.com

### Contact Name Lee Mei Yee Julia

Contact Phone + 852-6309-2280

Accredited to ISO/IEC 17025:2017

Effective Date October 19, 2020

MEASURED QUANTITY or DEVICE TYPE CALIBRATED	RANGE	UNCERTAINTY <sup>1,2</sup> (±)	CALIBRATION PROCEDURE AND/OR STANDARD EQUIPMENT USED					
Dimensional								
Caliper -Vernier, Dial & Electronic <sup>3</sup>	0 mm to 300 mm	30 µm	Checker by comparison method (BS 887:1982)					
Steel Ruler <sup>3</sup>	1 mm to 1000 mm	280 µm	Reference Steel Rule by comparison method (BS 4372:1968)					
Dial Indicator / Gauge (Plunger) <sup>3</sup>	0 mm to 50 mm	8 µm	Reference micrometer head by comparison method (BS 907:2008)					
Feeler Gauge <sup>3</sup>	0.01 mm to 1 mm	8 µm	Reference Dial Gauge by comparison method (BS BS957-2008)					
Measuring tape <sup>3</sup>	0 m to 1.5 m	1200 µm	Reference steel ruler by comparison method (BS 4035:1966)					
Engineering Square <sup>3</sup>	Length 0 mm to 160 mm	20 µm	Reference engineering square and Feeler Gauge (BS 939:2007)					
Slump cone <sup>3</sup>	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)					
Tamping rod <sup>3</sup>	Diameter = 0 mm to 16 mm Length = 600 mm	600 μm 950 μm	Reference steel ruler & Reference Caliper by direct measurement (Verification in accordance with in-house method for the dimensional					

### CALIBRATION AND MEASUREMENT CAPABILITY (CMC) $^{\ast}$

\* 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
			requirements as specified CS1:1990 Vol.1 A5;CS1: 2010 Vol. 1, A6)
Cube mould <sup>3</sup>	(Max dimensions 150 mm per side) Dimension Flatness Perpendicularity Parallelism	50 μm 10 μm 10 μm 50 μm	Reference Caliper, straight edge & feeler gauge by direct measurement. (Verification in accordance with in-house method for the dimensional requirements as specified in BS1881: Part 108:1983; CS1:1990 Vol1, A21; CS1:2010 Vol 1, A25; BS EN 12390-2:2000)
Compacting Bar <sup>3</sup>	Ramming Face = 25 mm Length = 380 mm Weight = 1.8 kg	100 μm 560 μm 1 g	Reference Caliper & Steel ruler by direct measurement. (Verification in accordance with in-house method for the dimensional & mass requirements as specified in BS1881: 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:Part 204:1988 CI.6.4- Method C)
Flow table <sup>3</sup>	15 kg to 17 kg 1 mm 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 bydirect measurement
	Mechanie	cal	
Force Measuring Machine <sup>3</sup> (Compression Mode)	1 kN to 3000 kN	0.4 %	Ref. 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
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/m <sup>3</sup>	By comparison method by using reference laser dust meter





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MEASURED QUANTITY or DEVICE TYPE CALIBRATED	RANGE	UNCERTAINTY <sup>1,2</sup> (±)	CALIBRATION PROCEDURE AND/OR STANDARD EQUIPMENT USED
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)	1 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 1 g 7 g	Standard Weight E2/ F1 Class & Weighing Balances by comparison method (OIMLR111)
Weighing Scale & Balance <sup>3</sup>	1 g to 200 g 200 g to 5 kg 5 kg to 50 kg	1 mg 1 g 15 g	Standard weight of E2/F1 Grade by direct measurement
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
	Therma	I	
Digital/Liquid in Glass Thermometers & <i>RTD/</i> 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)
	Time and Free	quency	
Stop Watch/ Timer <sup>3</sup>	10 s to 3600 s	0.2 s	Reference stop watch



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MEASURED QUANTITY or DEVICE TYPE CALIBRATED	-	(±)	CALIBRATION PROCEDURE AND/OR STANDARD EQUIPMENT USED
Grout Flow Cone <sup>3</sup>	7 s to 9 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

🕤 back

Economy	Logo	Name of Partner	URL	Test Area
United Kingdom of Great Britain and Northern Ireland	UKAS SANTO SANTO SERVES	United Kingdom Accreditation Service (UKAS)	http://www.ukas.com	Calibration, Medical Testing, Proficiency Testing Provider, Reference Material Producer, Non-medical Testing
United States of America		AIHA Laboratory Accreditation Programs, LLC (AIHA-LAP, LLC)	http://www.aihaaccredite dlabs.org/	Non-medical Testing
United States of America	2	American Association for Laboratory Accreditation (A2LA)	http://www.a2la.org/	Calibration, Medical Testing, Proficiency Testing Provider, Reference Material Producer, Non-medical Testing
United States of America		ANSI-ASQ National Accreditation Board (ANAB)	https://www.ansi <u>.org/accr</u> editation/Default	Calibration, Medical Testing, Proficiency Testing Provider, Reference Material Producer, Non-medical Testing
United States of America	MILLION AND AND AND AND AND AND AND AND AND AN	International Accreditation Service Inc. (IAS)	http://www.iasonline.org/	Calibration, Non-medical Testing
United States of America	qalvn	National Voluntary Laboratory Accreditation Program (NVLAP)	http://www.nist.gov/nvlap	Calibration, 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	: 201108MCA-126F
Date of Report	: 12-Nov-20
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
	: LD-3B
Serial No.	: 235811
Scale Division	: 0.001 mg/m3
Range	: 0.001 to 1 mg/m3
Condition of Item	: Normal
Date Item Received	: 8-Nov-20
Date Calibrated	: 8-Nov-20
Calibration Location	: AQuality Calibration Lab.
Date of Next Calibration	: 7-Nov-21
Calibrated By	: Jessica Liu
Test Environment	

I est Environment					
Ambient Temperature	:	27.5	°C to	23.9	°C
Relative Humidity	:	51	% to	83	%

### **Calibration Results**

Reference True Reading (mg/m3)	Average IUC Reading (mg/m <sup>3</sup> )	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.

Approved by:

LEE Mei Yee, Julia Managing Director



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, 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	: 201108MCA-126F
Date of Report	: 12-Nov-20
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 capability 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

TEL : 852-3582-9589 FAX : 852-2674-1177 EMAIL : cal.aqtl@gmail.com WEBSITE: www.aqtlgroup.com

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

#### **CERTIFICATE OF CALIBRATION**

Apex Testing & Certification Ltd.	Test Report No.	201108MCA-126F
Unit D6A, 10/F, TML Tower, 3 Hoi Shing Road, Tsuen Wan, N.T., HK	Date of Issue	12-Nov-20
	Date of Testing	8-Nov-20
	Page	1 of 1

#### **Item for Calibration**

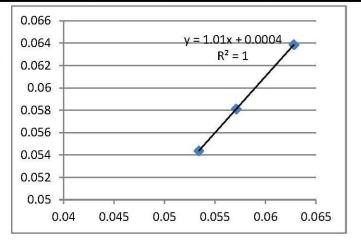
Description	: Laser Dust Monitor
Manufacturer	: Sibata Scientific Technology Ltd
Model No.	: LD-3B
Serial No.	: 235811

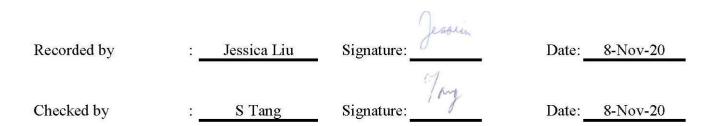
#### Standard Equipment

Volume Sampler / Calibration Orifice
n Environmental, Inc.
170 / TE-5025A
/ 3543
v-20 / 2-Nov-20

Date	Time	Mean Temp	Mean	Concentration	Concentration
			3253	Standard	Calibrated
			Pressure	Equipment	Equipment
		(°C)	(hPa)	(mg/m3)	(mg/m3)
8-Nov-20	20:15	25.7	1017.2	0.0628	0.0639
8-Nov-20	21:20	25.7	1017.2	0.0534	0.0544
8-Nov-20	22:25	25.7	1017.2	0.0571	0.0581

By Linear Regression of	fΥ	or X
Slope (K-factor)	:	1.0100
Correlation Coefficient	•	1.0000
Validity of Calibration	:	7-Nov-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

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	CERTIFICATE OF CALIBRATION
Report Number	: 201108MCA-123F
Date of Report	: 12-Nov-20
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.	
	: Sibata Scientific Technology Ltd
Model No.	
Serial No.	
Scale Division	
Range	: 0.001  to  1  mg/m3
Condition of Item	
Date Item Received	: 8-Nov-20
Date Calibrated	: 8-Nov-20
Calibration Location	: AQuality Calibration Lab.
Date of Next Calibration	: 7-Nov-21
Calibrated By	: Jessica Liu

Test Environment					
Ambient Temperature		27.5	°C to	23.9	°C
Relative Humidity	:	51	% to	83	%

### **Calibration Results**

Reference True Reading (mg/m3)	Average IUC Reading (mg/m <sup>3</sup> )	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

<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.

20

Approved by:

LEE Mei Yee, Julia Managing Director



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, 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	: 201108MCA-123F
Date of Report	: 12-Nov-20
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 capability 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.	201108MCA-123F		
Unit D6A, 10/F, TML Tower, 3 Hoi Shing Road, Tsuen Wan, N.T., HK	Date of Issue	12-Nov-20		
	Date of Testing	8-Nov-20		
	Page	1 of 1		

#### **Item for Calibration**

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

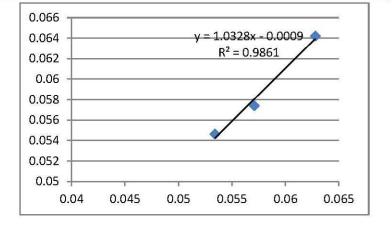
#### Standard Equipment

: High Volume Sampler / Calibration Orifice
: Tisch Environmental, Inc.
: TE-5170 / TE-5025A
4344 / 3543
: 8-Nov-20 / 2-Nov-20

Date	Time		Mean Pressure	Concentration	Concentration
		Mean Temp		Standard	Calibrated
				Equipment	Equipment
		(°C)	(hPa)	(mg/m3)	(mg/m3)
8-Nov-20	20:15	25.7	1017.2	0.0628	0.0642
8-Nov-20	21:20	25.7	1017.2	0.0534	0.0546
8-Nov-20	22:25	25.7	1017.2	0.0571	0.0574

Y or X
1.0328
0.9861
7-Nov-21

:



Jessin Recorded by Signature: Jessica Liu Date: 8-Nov-20 •

Checked by

S Tang

Signature:

Date: 8-Nov-20

#### 東恒測試顧問有限公司 **AQuality AQUALITY TESTCONSULT LIMITED**

#### 香港新界粉嶺坪鲞路啟芳園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	: 201108MCA-125F
Date of Report	: 12-Nov-20
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.	: 567188
Scale Division	: 0.001 mg/m3
Range	: 0.001 to 1 mg/m3
Condition of Item	: Normal
n Received	: 8-Nov-20

Date Item Received	: <b>8-</b> N	ov-20			
Date Calibrated	: <b>8-</b> N	ov-20			
Calibration Location	: AQ	uality Cali	bration Lab.		
Date of Next Calibration	: 7-N	ov-21			
Calibrated By	: Jess	ica Liu			
Test Environment					
Ambient Temperature	:	27.5	°C to	23.9	°C
Relative Humidity	:	51	% to	83	%

### **Calibration Results**

Reference True Reading (mg/m3)	Average IUC Reading (mg/m <sup>3</sup> )	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.

20

Approved by:

LEE Mei Yee, Julia Managing Director



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&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

#### **CERTIFICATE OF CALIBRATION**

Report Number	: 201108MCA-125F
Date of Report	: 12-Nov-20
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 capability 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.	201108MCA-125F
Unit D6A, 10/F, TML Tower, 3 Hoi Shing Road, Tsuen Wan, N.T., HK	Date of Issue	12-Nov-20
	Date of Testing	8-Nov-20
	Page	1 of 1

#### **Item for Calibration**

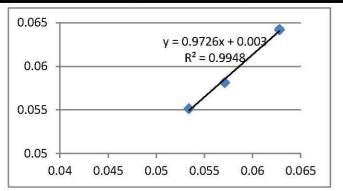
Description	: Laser Dust Monitor
Manufacturer	: Sibata Scientific Technology Ltd
Model No.	: LD-3B
Serial No.	: 567188

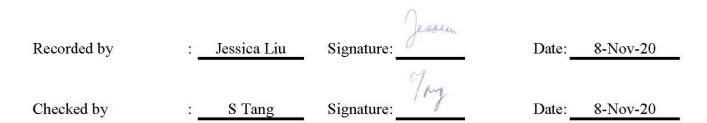
#### <u>Standard Equipment</u>

Description :	High Volume Sampler / Calibration Orifice
Manufacturer :	Tisch Environmental, Inc.
Model No.	TE-5170 / TE-5025A
Serial No.	4344 / 3543
Last Calibration :	8-Nov-20 / 2-Nov-20

			Mean	Concentration	Concentration
Date	Time	Mean Temp	Pressure	Standard	Calibrated
Date	1 mile		riessure	Equipment	Equipment
	(° <b>C</b>		(hPa)	(mg/m3)	(mg/m3)
8-Nov-20	20:15	25.7	1017.2	0.0628	0.0642
8-Nov-20	21:20	25.7	1017.2	0.0534	0.0552
8-Nov-20	22:25	25.7	1017.2	0.0571	0.0581

By Linear Regression of	fΥ	or X
Slope (K-factor)	:_	0.9726
Correlation Coefficient	:	0.9948
Validity of Calibration	:	7-Nov-21







#### 综合試驗 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 Boad, Kwai Chung, New Territories.



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.:	20CA1005 01-05		Page	1	of	2
Item tested						
Description: Manufacturer: Type/Model No.: Serial/Equipment No.: Adaptors used:	Sound Level Meter (C Hangzhou Aihua Instr AWA5661 301135 -		Microphone - AWA14425 15338 -			
Item submitted by						
Customer Name: Address of Customer: Request No.: Date of receipt:	Apex Testing & Certif Unit D6A, 10/F, TML - 05-Oct-2020	ication Ltd. Tower, 3 Hoi Shing Ro	oad, Tsuen Wan, N.T.			
Date of test:	09-Oct-2020					
Reference equipment	used in the calibrat	ion				
Description: Multi function sound calibrator Signal generator	Model: B&K 4226 DS 360	<b>Serial No.</b> 2288444 61227	Expiry Date: 23-Aug-2021 24-Dec-2020		<b>Traceat</b> CIGISME CEPREI	
Ambient conditions						
Temperature: Relative humidity: Air pressure:	22 ± 1 °C 55 ± 10 % 1005 ± 5 hPa					
Test specifications						

- 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: Company Chop:** Date: 10-Oct-2020 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.

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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.



20CA1005 01-05

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)

Page 2 of 2

#### 1, Electrical Tests

Certificate No.:

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.

			Expanded	Coverage
Test:	Subtest:	Status:	Uncertanity (dB)	Factor
o . K	•	Dees	0.2	
Self-generated noise	A	Pass	0.3	0.4
	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	
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	
rine neighting i	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.

Subtest	Status	Expanded Uncertanity (dB)	Coverage Factor
Weighting A at 125 Hz	Pass	0.3	
Weighting A at 8000 Hz	Pass	0.5	
	Weighting A at 125 Hz	Weighting A at 125 Hz Pass	SubtestStatusUncertanity (dB)Weighting A at 125 HzPass0.3

#### 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: Fung Chi Yip Feng nqi Date: 10-Oct-2020 Date: 09-Oct-2020

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

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.



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



Test Data for Sou	and Level Me	ter				Page 1 of 5
Sound level me		AWA5661 AWA14425	Serial No. Serial No.	301135 15338	Date	09-Oct-2020
Microphone	type:	AVVA 14420	Senarino.	10000	Report	: 20CA1005 01-05

#### 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	12.3	dB
Noise level in C weighting	13.6	dB
Noise level in Lin	18.2	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	Deviation		
Reference/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	98.9	98.9	0.7	-0.1	-0.1		
104.0	103.9	103.9	0.7	-0.1	-0.1		
109.0	108.9	108.9	0.7	-0.1	-0.1		
114.0	113.9	113.9	0.7	-0.1	-0.1		
115.0	114.9	114.9	0.7	-0.1	-0.1		
116.0	115.9	115.9	0.7	-0.1	-0.1		
117.0	116.9	116.9	0.7	-0.1	-0.1		
118.0	117.9	117.9	0.7	-0.1	-0.1		
119.0	118.9	118.9	0.7	-0.1	-0.1		
120.0	119.9	119.9	0.7	-0.1	-0.1		
89.0	89.0	89.0	0.7	0.0	0.0		
84.0	84.0	84.0	0.7	0.0	0.0		
79.0	79.0	79.0	0.7	0.0	0.0		
74.0	74.0	74.0	0.7	0.0	0.0		
69.0	69.0	69.0	0.7	0.0	0.0		
64.0	64.0	64.0	0.7	0.0	0.0		
59.0	59.0	59.0	0.7	0.0	0.0		
54.0	54.1	54.1	0.7	0.1	0.1		
49.0	49.0	49.0	0.7	0.0	0.0		
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	29.0	29.0	0.7	0.0	0.0		
28.0	28.0	28.0	0.7	0.0	0.0		

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香港新界 葵涌 永基路 2 2 - 2 4 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



Test Data for Sound Level Meter Page								
Sound level meter type: Microphone type:	AWA5661 AWA14425		ial No. 30113 ial No. 15338		e 09-Oct-			
27.0	27.1	27.1	0.7	0.1	0.1			

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
27-120	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

	5			
Ranges	Reference/Expected level	Actual level	Tolerance	Deviation
dB	dB	dB	+/- dB	dB
07 100	29.0	29.0	0.7	0.0
27-120	118.0	117.9	0.7	-0.1
15 1 10	47.0	47.1	0.7	0.1
45-140	138.0	137.8	0.7	-0.2

#### 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	54.4	1.5	1.5	-0.2
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	95.3	1.0	1.0	0.1
3981.0	94.0	95.0	95.3	1.0	1.0	0.3
7943.0	94.0	92.9	93.6	1.5	3.0	0.7
12590.0	94.0	89.7	89.4	3.0	6.0	-0.3

Frequency weighting C:

requeres melgrang en						
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	91.0	90.9	1.5	1.5	-0.1
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
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

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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

	S	M	E	С	La	b
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Page 3 of 5

Test Data for Sound Level Meter

Sound level met		WA5661 WA14425	Serial No. Serial No.	301 153			Oct-2020
nor non-real ran transmission of the 2						Report: 200	A1005 01-05
1995.0	94.0	93.8	93.9	1.0	1.0	0.1	
3981.0	94.0	93.2	93.5	1.0	1.0	0.3	
7943.0	94.0	91.0	91.7	1.5	3.0	0.7	
12590.0	94.0	87.8	87.5	3.0	6.0	-0.3	
Frequency weigl	hting Lin:						7
Frequency	Ref. level	Expected level	Actual level	Tolera	nce(dB)	Deviation	
1.0	ID		ЧD			dP	

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	93.9	1.5	1.5	-0.1
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)

when the signal is continuous.	(vvoigner, maxin	(voight), maximum nora)				
Ref. level	Expected level	Actual level	Tolera	nce(dB)	Deviation	
dB	dB	dB	+	-	dB	
116.0	115.0	114.9	1.0	1.0	-0.1	

#### 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)

Whom the eighter to contained at	(				
Ref. level	Expected level	Actual level	Tolera	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 7, set the generator signal to single, Lzpeak)

r usitive polarities.	(voighting £, oot the gen	erater ergmante en	.g.e,p.e.e.e.	
Ref. level	Response to 10 ms	Response to 100 us	Tolerance	Deviation
dB	dB	dB	+/- dB	dB
119.0	119.0	119.5	2.0	0.5

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Test Data for So	und Level Me	eter				Page 4 of 5
Sound level me Microphone	eter type: type:	AWA5661 AWA14425	Serial No. Serial No.	301135 15338	Date Report	09-Oct-2020 : 20CA1005 01-05
Negative polar	ities:					

Ref. level	Response to 10 ms	Response to 100 us	Tolerance	Deviation
dB	dB	dB	+/- dB	dB
119.0	119.0	119.5	2.0	0.5

#### **RMS ACCURACY TEST**

The RMS detector accuracy is tested on the reference range for a crest factor of 3.

The Trivio detector	accuracy is icsicu	on the reference ru	inge for a croot lactor	01 0.	
Test frequency:		2000 Hz			
Amplitude:		2 dB below the up	per limit of the prima	ry indicator range.	
Burst repetitio	n frequency:	40 Hz			
Tone burst sig	nal:	11 cycles of a sine	e wave of frequency	2000 Hz. (Set	to INT)
	Ref. Level	Expected level	Tone burst signal	Tolerance	Deviation
Time wighting	dB	dB	indication(dB)	+/- dB	dB
Slow	117.0+6.6	117.0	116.6	0.5	-0.4

#### TIME WEIGHTING IMPULSE TEST

Time weighting I is tested on the reference range (Set the SLM to LAImax)

Test frequency: Amplitude: 2000 Hz 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

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	89.9	1.0	-0.1	60s integ.
10000	80.0	80.0	79.9	1.0	-0.1	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

Test frequency: 4000 Hz

Integration time: 10 sec

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Test Data for Sou	nd Level Me	eter				Page 5 of 5
Sound level me	ter type:	AWA5661	Serial No.	301135	Date	09-Oct-2020
Microphone	type:	AWA14425	Serial No.	15338	Report	: 20CA1005 01-05

e integrating	sound level meter s	et to Leq:			
Duration	Rms level of	Expected	Actual	Tolerance	Deviation
msec	tone burst (dB)	dB	dB	+/- dB	dB
10	90.0	60.0	60.0	1.7	0.0

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.

		0 0					
Test frequency:		2000 Hz					
Amplitude:		2 dB below the u	pper limit of the p	rimary indicator r	ange.		
Burst repetiti	ion frequency:	40 Hz					
Tone burst s	ignal:	11 cycles of a sine wave of frequency 2000 Hz.					
Level	Level reduced by	Further reduced	Difference	Tolerance	Deviation		
at overload (dB)	1 dB	3 dB	dB	dB	dB		
115.7	114.7	111.7	3.0	1.0	0.0		

For integrating SLM, with the instrument indicating Leq.

121.0

For integrating SLM, with the instrument indicating Leq and set to the reference range. The test signal as following: The test tone burst signal is superimposed on a baseline signal corresponding to the lower limit of reference range Test frequency: 4000 Hz Integration time: 10 sec Single burst duration: 1 msec Deviation Level reduced by Expected level Actual level Tolerance Rms level dB dB at overload (dB) 1 dB dB dB

#### ACOUSTIC TEST

122.0

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.

81.0

2.2

0.0

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

81.0

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

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### **CERTIFICATE OF CALIBRATION**

Certificate No.:	21CA0616 01-02	2	Page:	1	of	2
Item tested						
Description:	Acoustical Calib	rator (Class 1)				
Manufacturer:	Pulsar					
Type/Model No.:	100B					
Serial/Equipment No.:	039507					
Adaptors used:	Yes					
Item submitted by						
Customer:	Apex Testing & (					
Address of Customer:	Unit D6A, 10/F,	TML Tower, 3 Hoi Shing I	Road, Tsuen Wan, N.T.			
Request No.:	-					
Date of receipt:	16-Jun-2021					
Date of test:	18-Jun-2021					
Reference equipment	used in the cali	bration	2			
Description:	Model:	Serial No.	Expiry Date:		Traceab	le to:
Lab standard microphone	B&K 4180	2341427	04-May-2022		SCL	
Preamplifier	B&K 2673	2239857	31-May-2022		CEPREI	
Measuring amplifier	B&K 2610	2346941	01-Jun-2022		CEPREI	
Signal generator	DS 360	33873	27-May-2022		CEPREI	
Digital multi-meter	34401A	US36087050	27-May-2022		CEPREI	
Audio analyzer	8903B	GB41300350	28-May-2022		CEPREI	
Universal counter	53132A	MY40003662	02-Jun-2022		CEPREI	
Ambient conditions						
Temperature:	22 ± 1 °C					
Relative humidity:	55 ± 10 %					

#### **Test specifications**

Air pressure:

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

#### **Test results**

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

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

Approved Signatory:

Feng Junqi

1010 ± 5 hPa

19-Jun-2021 Company Chop:



**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.

Date:

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

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.



21CA0616 01-02

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### **CERTIFICATE OF CALIBRATION**

(Continuation Page)

Certificate No.:

2 of 2

Page:

#### 1, Measured Sound Pressure Level

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

Frequency	Output Sound Pressure	Measured Output	Estimated Expanded
Shown	Level Setting	Sound Pressure Level	Uncertainty
Hz	dB	dB	dB
1000	94.00	94.15	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 = 0.019 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 = 999.86 Hz	
Estimated expanded uncertainty	0.1 Hz	Coverage factor k = 2.2

#### 4, Total Noise and Distortion

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

At 1000 Hz	TND = 0.9 %
Estimated expanded uncertainty	0.7 %

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

	Λ	- End -	A (
Calibrated by:		Checked by:	Jacke
Date:	Fung Chi Yip 18-Jun-2021	Date:	Chan Yuk Yiu 19-Jun-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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