

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			-
			Mal Plant				···	1
	Run	Vol. Init (m3)	Vol. Final	ΔVol. (m2)	ΔTime (min)			
	<u></u> 1	1	(m3) 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	$\sqrt{\Delta H(Ta/Pa)}$	
	(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=	2.03936			m=	1.27701	
	QSTD	b=	-0.012		QA	b≃	-0.00805	
		r=	0.999	95		r=	0.99995	
				Calculatio	ns			
			/Pstd)(Tstd/Ta	}	······	ΔVol((Pa-Δl		
	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)				legulations Part 5	
		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.

145 South Miami Avenue Village of Cleves, OH 45002 <u>www.tisch-env.com</u> TOLL FREE: (877)263-7610 FAX: (513)467-9009



			Site I	nformation		
Location: ² Sampler: ⁷			Site ID: Serial No:	Zones 2A a Kowloon Cu 4340		Date: 9-Jan-21 Tech: ^{CS} Tang
			Site	Conditions		
Barometric Pressure (in Hg): 30.25 Temperature (deg F): 51 Average Press. (in Hg): 30.25 Average Temp. (deg F): 51				Corrected Pressure (mm Hg): 768 Temperature (deg K): 284 Corrected Average (mm Hg): 768 Average Temp. (deg K): 284		
			Calibra	ation Orifice		
Make: Tisch Model: TE-5025A Serial#: 3543					Qstd Slope: Qstd Intercept: Date Certified:	-0.01298
			Calibratio	on Informatic	n	
Plate or Test # 2 3 4 5	H2O (in) 12.30 10.40 7.20 4.50 2.20	Qstd (m3/min) 1.779 1.636 1.363 1.079 0.756	I (chart) 53.0 48.0 41.0 33.0 23.0	IC (corrected) 54.63 49.48 42.26 34.02 23.71	# 0	Linear Regression Slope: 29.6607 Intercept: 1.5918 Corr. Coeff: 0.9993
std = 1/m[Sqrt(F = I[Sqrt(Pa/Pst std = standard fl = corrected cha = actual chart re	ow rate art response	td/Ta))-b]	С	alculations	m = sampler slo b = sampler inte I = chart respon Tav = daily avera Pav = daily avera	ercept ise age temperature
= calibrator Qs = calibrator Qst a = actual tempe a = actual pressu std = 298 deg K std = 760 mm H pr subsequent ca	td slope td intercept rature during cal re during calibra	pler flow:			Averag Averag Sam	verage I (chart): 40 ge Flow Calculation m3/min 1.322513243 ge Flow Calculation in CFM 46.69794263 nple Time (Hrs): 1.0 Total Flow in m3/min 79.35079461 Total Flow in CFM 2801.876558



				nformation Zones 2A a	at West		
Location: AM3A			Site ID: Kowloon Cultural			Date: 5-Mar-21	
Sampler: TE-5170		Serial No:	4340		Tech: CS Tang		
			Site (Conditions			
	Barometric Pr	essure (in Hg): 3	0.00		Corrected Pres	ssure (mm Hg): 762	
Temperature (deg F): 70					Tempe	rature (deg K): 294	
Average Press. (in Hg): 30.00					Corrected Ave	rage (mm Hg): 762	
	Average	Temp. (deg F): 7	0		Average '	Temp. (deg K): 294	
			Calibra	tion Orifice			
	Make: '				Qstd Slope: 2		
		TE-5025A			Qstd Intercept: -		
	Serial#:	3543			Date Certified: 2	2-Nov-20	
			Calibratio	on Informatio	on		
Plate or	H2O	Qstd	I	IC		<u>_</u>	
Test #	(in)	(m3/min)	(chart)	(corrected)		Linear Regression	
1	12.40	1.747	53.0	53.43		Slope: 30.3475	
2	10.60	1.616	48.0	48.39		Intercept: 0.3038	
3	7.00	1.314	41.0	41.33		Corr. Coeff: 0.9978	
4 5	4.70 2.40	1.078 0.772	33.0 23.0	33.27 23.19	# 0	f Observations: 5	
	2.10	01772					
			Ca	alculations			
1 / [C+((11)(D-/D-+1)/T-	td = 1/m[Sqrt(H2O(Pa/Pstd)(Tstd/Ta))-b]					
		std/Ta))-b]			m = sampler slop		
	(H2O(Pa/Pstd)(Ts std)(Tstd/Ta)]	std/Ta))-b]			b = sampler inter	rcept	
I[Sqrt(Pa/Ps	std)(Tstd/Ta)]	std/Ta))-b]			b = sampler inter I = chart response	rcept e	
I[Sqrt(Pa/Ps = standard f	std)(Tstd/Ta)] flow rate	std/Ta))-b]			b = sampler interI = chart responsTav = daily average	rcept e ge temperature	
I[Sqrt(Pa/Ps = standard f corrected ch	std)(Tstd/Ta)] flow rate nart response	std/Ta))-b]			b = sampler inter I = chart response	rcept 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]			b = sampler inter I = chart respons Tav = daily averag Pav = daily averag	rcept 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 Qstd slope	std/Ta))-b]			b = sampler inter I = chart respons Tav = daily averag Pav = daily averag Av	rcept e ge temperature ge pressure rerage I (chart): 40	
I[Sqrt(Pa/Ps = standard f corrected ch ctual chart ro calibrator Q calibrator Q	std)(Tstd/Ta)] flow rate nart response esponse 2std slope std intercept				b = sampler inter I = chart respons Tav = daily averag Pav = daily averag Av	rcept e ge temperature ge pressure erage I (chart): 40 e Flow Calculation m3/min	
I[Sqrt(Pa/Ps = standard f corrected ch ctual chart ro calibrator Q calibrator Q actual temp	std)(Tstd/Ta)] flow rate nart response esponse 2std slope std intercept erature during cal	libration (deg K)			b = sampler inter I = chart respons Tav = daily averag Pav = daily averag Averag	rcept e ge temperature ge pressure rerage I (chart): 40 e Flow Calculation m3/min 1.305448932	
I[Sqrt(Pa/Ps = standard f corrected ch ctual chart ra calibrator Q calibrator Q actual temp actual press	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 respons Tav = daily averag Pav = daily averag Averag	rcept e ge temperature ge pressure rerage I (chart): 40 e Flow Calculation m3/min 1.305448932 e Flow Calculation in CFM	
I[Sqrt(Pa/Ps = standard f corrected ch ctual chart ra calibrator Q calibrator Q actual temp actual press = 298 deg K	std)(Tstd/Ta)] flow rate nart response esponse 2std slope std intercept erature during cal ure during calibra 5	libration (deg K)			b = sampler inter I = chart respons Tav = daily averag Pav = daily averag Averag Averag	rcept e ge temperature ge pressure rerage I (chart): 40 e Flow Calculation m3/min 1.305448932 e Flow Calculation in CFM 46.09540178	
I[Sqrt(Pa/Ps = standard f corrected ch ctual chart ra calibrator Qs actual temp actual press = 298 deg K = 760 mm F	std)(Tstd/Ta)] flow rate nart response esponse 2std slope std intercept erature during cal ure during calibra K Hg	libration (deg K) ation (mm Hg)			b = sampler inter I = chart respons Tav = daily averag Pav = daily averag Averag Averag Samp	rcept e ge temperature ge pressure rerage I (chart): 40 e Flow Calculation m3/min 1.305448932 e Flow Calculation in CFM 46.09540178 ple Time (Hrs): 1.0	
I[Sqrt(Pa/Ps = standard f corrected ch ctual chart ra calibrator Q actual temp 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 Hg alculation of sam	libration (deg K) ation (mm Hg) pler flow:			b = sampler inter I = chart respons Tav = daily averag Pav = daily averag Averag Averag Samp	rcept e ge temperature ge pressure rerage I (chart): 40 e Flow Calculation m3/min 1.305448932 e Flow Calculation in CFM 46.09540178 ple Time (Hrs): 1.0 Total Flow in m3/min	
I[Sqrt(Pa/Ps = standard f corrected ch ctual chart ra calibrator Q actual temp 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 K Hg	libration (deg K) ation (mm Hg) pler flow:			b = sampler inter I = chart respons Tav = daily averag Pav = daily averag Averag Averag Samp	rcept e ge temperature ge pressure erage I (chart): 40 e Flow Calculation m3/min 1.305448932 e Flow Calculation in CFM 46.09540178 ple Time (Hrs): 1.0 Cotal Flow in m3/min 78.3269359	
I[Sqrt(Pa/Ps = standard f corrected ch ctual chart ra calibrator Q actual temp 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 Hg alculation of sam	libration (deg K) ation (mm Hg) pler flow:			b = sampler inter I = chart respons Tav = daily averag Pav = daily averag Averag Averag Samp	rcept e ge temperature ge pressure rerage I (chart): 40 e Flow Calculation m3/min 1.305448932 e Flow Calculation in CFM 46.09540178 ple Time (Hrs): 1.0 Total Flow in m3/min	



			Site I	nformation		
Location: AM4A Sampler: TE-5170			Site ID: Serial No:	Zones 2A a Kowloon Cu 3998		Date: 9-Jan-21 Tech: CS Tang
			Site (Conditions		
Barometric Pressure (in Hg): 30. Temperature (deg F): 51 Average Press. (in Hg): 30. Average Temp. (deg F): 51			1 0.25		Tempe Corrected Ave	ssure (mm Hg): 768 erature (deg K): 284 erage (mm Hg): 768 Temp. (deg K): 284
	Make:	Ticch	Calibra	tion Orifice	Qstd Slope: 2	2 02026
		FE-5025A			Qstd Intercept: Date Certified:	-0.01298
			Calibratio	on Informatic	n	
Plate or Test # 1 2 3 4 5	H2O (in) 12.30 10.30 7.50 4.20 2.30	Qstd (m3/min) 1.779 1.628 1.391 1.042 0.773	I (chart) 53.0 48.0 41.0 33.0 23.0	IC (corrected) 54.63 49.48 42.26 34.02 23.71	# 0	Linear Regression Slope: 29.6295 Intercept: 1.6295 Corr. Coeff: 0.9971
				alculations		
Qstd = 1/m[Sqrt(H: IC = I[Sqrt(Pa/Pstd Qstd = standard flo IC = corrected chan I = actual chart resp)(Tstd/Ta)] w rate t response	td/Ta))-b]			 m = sampler slo b = sampler interimeter I = chart response Tav = daily avera Pav = daily avera 	ercept se age temperature
f = actual chart respm = calibrator Qstb = calibrator QstTa = actual temperaPa = actual pressurTstd = 298 deg KPstd = 760 mm HgFor subsequent calc1/m((I)[Sqrt(298/Ta	d slope l intercept ature during cal e during calibra culation of sam	ation (mm Hg) pler flow:			Averag Averag Sam	verage I (chart): 40 ge Flow Calculation m3/min 1.322634005 ge Flow Calculation in CFM 46.70220672 gle Time (Hrs): 1.0 Total Flow in m3/min 79.3580403 Total Flow in CFM 2802.132403



Location:	AM4A			Zones 2A a Kowloon Cu		Date: 5-Mar-23
Sampler: TE-5170 Serial No: 39				Tech: CS Tang		
			Site (Conditions		
	Barometric Pr	essure (in Hg): 3		Conditions	Corrected Pres	sure (mm Hg): 762
Temperature (deg F): 70						rature (deg K): 294
Average Press. (in Hg): 30.00						rage (mm Hg): 762
	Average	Temp. (deg F): 7	0		Average '	Temp. (deg K): 294
			Calibra	tion Orifice		
	Make: '	Tisch			Qstd Slope: 2	
		TE-5025A			Qstd Intercept: -	
	Serial#:	3543			Date Certified: 2	-Nov-20
			Calibratio	on Informatio	on	
Plate or	H2O	Qstd	I	IC		
Test #	(in)	(m3/min)	(chart)	(corrected)		Linear Regression
1	12.40	1.747	53.0	53.42		Slope: 30.1729
2	10.10	1.577	48.0	48.38		Intercept: 0.6595
3	7.70	1.378	41.0	41.32		Corr. Coeff: 0.9968
4 5	4.30 2.40	1.031 0.772	33.0 23.0	33.26 23.18	# 0	f Observations: 5
5	2.10	0.772			# 0.	
			Ca	alculations		
	td = 1/m[Sqrt(H2O(Pa/Pstd)(Tstd/Ta))-b]					
		std/Ta))-b]			m = sampler slop	
	[H2O(Pa/Pstd)(Ts std)(Tstd/Ta)]	std/Ta))-b]			b = sampler inter	rcept
I[Sqrt(Pa/Ps	std)(Tstd/Ta)]	std/Ta))-b]			b = sampler inter I = chart respons	rcept e
I[Sqrt(Pa/Ps = standard f	std)(Tstd/Ta)] flow rate	std/Ta))-b]			b = sampler interI = chart responsTav = daily average	rcept e ge temperature
I[Sqrt(Pa/Ps = standard f corrected ch	std)(Tstd/Ta)] flow rate nart response	std/Ta))-b]			b = sampler inter I = chart respons	rcept 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]			b = sampler inter I = chart respons Tav = daily averag Pav = daily averag	rcept 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 2std slope	std/Ta))-b]			b = sampler inter I = chart respons Tav = daily averag Pav = daily averag	rcept e ge temperature ge 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 hart response esponse 2std slope std intercept				b = sampler inter I = chart respons Tav = daily averag Pav = daily averag	rcept e ge temperature ge 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 hart response esponse std slope std slope std intercept erature during cal	libration (deg K)			b = sampler inter I = chart respons Tav = daily averag Pav = daily averag Averag	rcept e ge temperature ge pressure erage I (chart): 40 e Flow Calculation m3/min 1.300964753
I[Sqrt(Pa/Ps = standard f corrected ch ctual chart re calibrator Q calibrator Q actual tempo actual presso	std)(Tstd/Ta)] flow rate nart response esponse 2std slope std intercept erature during calibra	libration (deg K)			b = sampler inter I = chart respons Tav = daily averag Pav = daily averag Averag	rcept e ge temperature ge pressure erage I (chart): 40 e Flow Calculation m3/min 1.300964753 e Flow Calculation in CFM
[[Sqrt(Pa/Ps = standard f corrected ch tual chart re calibrator Qs actual tempo actual presss = 298 deg K	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 respons Tav = daily averag Pav = daily averag Averag Averag 	rcept e ge temperature ge pressure erage I (chart): 40 e Flow Calculation m3/min 1.300964753 e Flow Calculation in CFM 45.93706542
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 2std slope std intercept erature during cal ure during calibra 5 Hg	libration (deg K) ation (mm Hg)			b = sampler inter I = chart respons Tav = daily averag Pav = daily averag Averag Averag Samp	rcept e ge temperature ge pressure erage I (chart): 40 e Flow Calculation m3/min 1.300964753 e Flow Calculation in CFM 45.93706542 ble Time (Hrs): 1.0
I[Sqrt(Pa/Ps = standard f corrected ch ctual chart re calibrator Qs actual tempo actual press = 298 deg K = 760 mm H ubsequent 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:			b = sampler inter I = chart respons Tav = daily averag Pav = daily averag Averag Averag Samp	rcept e ge temperature ge pressure erage I (chart): 40 e Flow Calculation m3/min 1.300964753 e Flow Calculation in CFM 45.93706542 ole Time (Hrs): 1.0 'otal Flow in m3/min
I[Sqrt(Pa/Ps = standard f corrected ch ctual chart re calibrator Qs actual tempo actual press = 298 deg K = 760 mm H ubsequent ca	std)(Tstd/Ta)] flow rate nart response esponse 2std slope std intercept erature during cal ure during calibra 5 Hg	libration (deg K) ation (mm Hg) pler flow:			b = sampler inter I = chart respons Tav = daily averag Pav = daily averag Averag Averag Samp	rcept e ge temperature ge pressure erage I (chart): 40 e Flow Calculation m3/min 1.300964753 e Flow Calculation in CFM 45.93706542 ble Time (Hrs): 1.0 'otal Flow in m3/min 78.05788516
I[Sqrt(Pa/Ps = standard f corrected ch ctual chart re calibrator Qs actual tempo actual press = 298 deg K = 760 mm H ubsequent 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:			b = sampler inter I = chart respons Tav = daily averag Pav = daily averag Averag Averag Samp	rcept e ge temperature ge pressure erage I (chart): 40 e Flow Calculation m3/min 1.300964753 e Flow Calculation in CFM 45.93706542 ole Time (Hrs): 1.0 'otal Flow in m3/min



			Site I	nformation			
	Location: AM5A Sampler: TE-5170 S			Zones 2A at We Site ID: Kowloon Cultu: Serial No: 4344		Date: 9-Jan-21 Tech: CS Tang	
			Site	Conditions			
Barometric Pressure (in Hg): 30.25 Temperature (deg F): 51 Average Press. (in Hg): 30.25 Average Temp. (deg F): 51					Corrected Pressure (mm Hg): 768 Temperature (deg K): 284 Corrected Average (mm Hg): 768 Average Temp. (deg K): 284		
			Calibra	ation Orifice			
	Make: Tisch Model: TE-5025A Serial#: 3543				Qstd Slope: Qstd Intercept: Date Certified:	-0.01298	
			Calibratio	on Informatio	n		
Plate or Test # 2 3 4 5	H2O (in) 12.40 10.20 7.30 4.30 2.40	Qstd (m3/min) 1.786 1.621 1.372 1.054 0.789	I (chart) 53.0 48.0 41.0 33.0 23.0	IC (corrected) 54.63 49.48 42.26 34.02 23.71	# (Linear Regression Slope: 30.1991 Intercept: 0.8190 Corr. Coeff: 0.9977 of Observations: 5	
-	(Tstd/Ta)] v rate response onse	td/Ta))-b]	С	alculations	m = sampler slo b = sampler into I = chart respon Tav = daily avera Pav = daily avera	ercept ise age temperature age pressure	
I = actual chart response m = calibrator Qstd slope b = calibrator Qstd intercept Ta = actual temperature during calibration (deg K) Pa = actual pressure during calibration (mm Hg) Tstd = 298 deg K Pstd = 760 mm Hg For subsequent calculation of sampler flow: 1/m((I)[Sqrt(298/Tav)(Pav/760)]-b)				Avera; Avera; San	verage I (chart): 40 ge Flow Calculation m3/min 1.324526469 ge Flow Calculation in CFM 46.76902962 nple Time (Hrs): 1.0 Total Flow in m3/min 79.47158813 Total Flow in CFM 2806.141777		



				Zones 2A a Kowloon Cu		Date: 5-Mar-22
Sampler:	Sampler: TE-5170Serial No: 4344			4344		Tech: CS Tang
			Site (Conditions		
Barometric Pressure (in Hg): 30.00						ssure (mm Hg): 762
Temperature (deg F): 70					-	erature (deg K): 294
Average Press. (in Hg): 30.00					erage (mm Hg): 762	
	Average	Temp. (deg F): 7	0		Average	Temp. (deg K): 294
			Calibra	ation Orifice		
	Make:				Qstd Slope:	
	Serial#:	TE-5025A			Qstd Intercept: Date Certified:	
	Schaim.	3343			Date Certificu.	2-11-2020
		0.1		on Informatio	on	
Plate or	H2O	Qstd	I (alsout)	IC (compared)		Tinon Domosion
Test #	(in) 12.30	(m3/min) 1.740	(chart) 53.0	(corrected) 53.42		Linear Regression Slope: 29.0366
2	12.30	1.600	48.0	48.38		Intercept: 2.5832
3	7.30	1.342	41.0	41.32		Corr. Coeff: 0.9971
4	4.10					
					of Observations: 5	
5	2.20	0.739	23.0	23.18	#(of Observations: 5
5	2.20	0.739			# (of Coservations: 5
				alculations		
= 1/m[Sqrt(I	H2O(Pa/Pstd)(Ts				m = sampler slo	pe
= 1/m[Sqrt(I						pe rcept
= 1/m[Sqrt(I I[Sqrt(Pa/Pst	H2O(Pa/Pstd)(Ts td)(Tstd/Ta)]				m = sampler slo b = sampler inte	pe orcept se
= 1/m[Sqrt(I I[Sqrt(Pa/Pst = standard fl corrected cha	H2O(Pa/Pstd)(Ts td)(Tstd/Ta)] low rate art response				m = sampler slo b = sampler inte I = chart respon	pe orcept se ge temperature
= 1/m[Sqrt(I I[Sqrt(Pa/Pst = standard fl corrected cha ctual chart re	H2O(Pa/Pstd)(Ts td)(Tstd/Ta)] low rate art response :sponse				m = sampler slo b = sampler inte I = chart respon Tav = daily avera Pav = daily avera	pe rcept se ge temperature ge pressure
= 1/m[Sqrt(I I[Sqrt(Pa/Pst = standard fl corrected cha ctual chart re calibrator Qs	H2O(Pa/Pstd)(Ts td)(Tstd/Ta)] low rate art response ssponse std slope				m = sampler slo b = sampler inte I = chart respon Tav = daily avera Pav = daily avera	pe rcept se ge temperature ge pressure verage I (chart): 40
= 1/m[Sqrt(I I[Sqrt(Pa/Pst = standard fl corrected cha ctual chart re calibrator Qs calibrator Qs	H2O(Pa/Pstd)(Ts td)(Tstd/Ta)] low rate art response ssponse std slope td intercept	std/Ta))-b]			m = sampler slo b = sampler inte I = chart respon Tav = daily avera Pav = daily avera	pe prcept se ge temperature ge pressure verage I (chart): 40 ge Flow Calculation m3/min
= 1/m[Sqrt(I I[Sqrt(Pa/Pst = standard fl corrected cha ctual chart re calibrator Qs calibrator Qs actual tempe	H2O(Pa/Pstd)(Ts td)(Tstd/Ta)] low rate art response sponse std slope td intercept erature during cal	std/Ta))-b] libration (deg K)			m = sampler slo b = sampler inte I = chart respon Tav = daily avera Pav = daily avera A Averag	pe prcept se ge temperature ge pressure verage I (chart): 40 ge Flow Calculation m3/min 1.285627539
= 1/m[Sqrt(I [[Sqrt(Pa/Pst = standard f] corrected chat tual chart re calibrator Qs alibrator Qs actual tempe actual pressu	H2O(Pa/Pstd)(Ts td)(Tstd/Ta)] low rate art response sponse std slope td intercept erature during calibra ure during calibra	std/Ta))-b] libration (deg K)			m = sampler slo b = sampler inte I = chart respon Tav = daily avera Pav = daily avera A Averag	pe ercept se ge temperature ge pressure verage I (chart): 40 ge Flow Calculation m3/min 1.285627539 ge Flow Calculation in CFM
: 1/m[Sqrt(I [Sqrt(Pa/Pst : standard f] orrected cha ual chart re alibrator Qs ctual tempe ctual pressu 298 deg K	H2O(Pa/Pstd)(Ts td)(Tstd/Ta)] low rate art response ssponse std slope td intercept erature during calibra	std/Ta))-b] libration (deg K)			m = sampler slo b = sampler inte I = chart respon Tav = daily avera Pav = daily avera Averag Averag	pe prcept se ge temperature ge pressure verage I (chart): 4 0 ge Flow Calculation m3/min 1.285627539 ge Flow Calculation in CFM 45.3955084
= 1/m[Sqrt(I [[Sqrt(Pa/Pst = standard fl corrected cha tual chart re calibrator Qs alibrator Qs actual tempe actual pressu = 298 deg K = 760 mm H	H2O(Pa/Pstd)(Ts td)(Tstd/Ta)] low rate art response ssponse std slope td intercept erature during calibra ire during calibra	std/Ta))-b] libration (deg K) ation (mm Hg)			m = sampler slo b = sampler inte I = chart respon Tav = daily avera Pav = daily avera Averag Averag Sam	pe prcept se ge temperature ge pressure verage I (chart): 40 ge Flow Calculation m3/min 1.285627539 ge Flow Calculation in CFM 45.3955084 ple Time (Hrs): 1.0
= 1/m[Sqrt(I I[Sqrt(Pa/Pst = standard fl corrected cha ctual chart re calibrator Qs actual tempe actual pressu = 298 deg K = 760 mm H ubsequent ca	H2O(Pa/Pstd)(Ts td)(Tstd/Ta)] low rate art response sponse std slope td intercept erature during calibra ig ulculation of sam	std/Ta))-b] libration (deg K) ation (mm Hg) pler flow:			m = sampler slo b = sampler inte I = chart respon Tav = daily avera Pav = daily avera Averag Averag Sam	pe prcept se ge temperature ge pressure verage I (chart): 40 ge Flow Calculation m3/min 1.285627539 ge Flow Calculation in CFM 45.3955084 ple Time (Hrs): 1.0 Total Flow in m3/min
= 1/m[Sqrt(I I[Sqrt(Pa/Pst = standard fl corrected cha ctual chart re calibrator Qs actual tempe actual pressu = 298 deg K = 760 mm H subsequent ca	H2O(Pa/Pstd)(Ts td)(Tstd/Ta)] low rate art response ssponse std slope td intercept erature during calibra ire during calibra	std/Ta))-b] libration (deg K) ation (mm Hg) pler flow:			m = sampler slo b = sampler inte I = chart respon Tav = daily avera Pav = daily avera Averag Averag Sam	pe prcept se ge temperature ge pressure verage I (chart): 4 0 ge Flow Calculation m3/min 1.285627539 ge Flow Calculation in CFM 45.3955084 ple Time (Hrs): 1.0



CERTIFICATE OF ACCREDITATION

This is to attest that

AQUALILTY 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

AQUALILTY 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	RANGE	UNCERTAINTY ^{1,2} (±)	· /						
TYPE CALIBRATED		(-)	EQUIPMENT USED						
Dimensional									
Caliper -Vernier, Dial & Electronic ³	0 mm to 300 mm	30 µm	Checker by comparison method (BS 887:1982)						
Steel Ruler ³	1 mm to 1000 mm	280 µm	Reference Steel Rule by comparison method (BS 4372:1968)						
Dial Indicator / Gauge (Plunger) ³	0 mm to 50 mm	8 µm	Reference micrometer head by comparison method (BS 907:2008)						
Feeler Gauge ³	0.01 mm to 1 mm	8 µm	Reference Dial Gauge by comparison method (BS BS957-2008)						
Measuring tape ³	0 m to 1.5 m	1200 µm	Reference steel ruler by comparison method (BS 4035:1966)						
Engineering Square ³	Length 0 mm to 160 mm	20 µm	Reference engineering square and Feeler Gauge (BS 939:2007)						
Slump cone ³	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 ³	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)*

* 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 ^{1,2} (±)	CALIBRATION PROCEDURE AND/OR STANDARD EQUIPMENT USED
			requirements as specified CS1:1990 Vol.1 A5;CS1: 2010 Vol. 1, A6)
Cube mould ³	(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 ³	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 ³	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 ³	4 mm to 50 mm	50 µm	Reference Caliper bydirect measurement
	Mechanic	cal	
Force Measuring Machine ³ (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 ³	Dust particles 0.001 mg/m ³ to 10.00 mg/m ³	0.9 mg/m ³	By comparison method by using reference laser dust meter





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MEASURED QUANTITY or DEVICE TYPE CALIBRATED	RANGE	UNCERTAINTY ^{1,2} (±)	CALIBRATION PROCEDURE AND/OR STANDARD EQUIPMENT USED
Rebound Hammer ³	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 ³	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	1	
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 ³	(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 ³	40.0 °C to 180.0 °C	1.5 °C	Reference Temperature datalogger by Mapping Method (AS 2853:1986)
Furnace ³	200 °C to 1300 °C	6 °C	Reference Thermocouple with Indicator By single point Calibration (AS 2853:1986)
Water bath ³	15 °C to 95 °C	0.2 °C	Reference Temperature datalogger by Mapping Method (AS 2853:1986)
	Time and Free		
Stop Watch/ Timer ³	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 ³	7 s to 9 s		Reference stop watch by direct method (ASTM C939-10 Cl.9)

¹The 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.

²When 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.

³Also 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 ³)	Correction (mg/m ³)	Error of IUC Reading (%)	Expanded Uncertainty (mg/m ³)	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

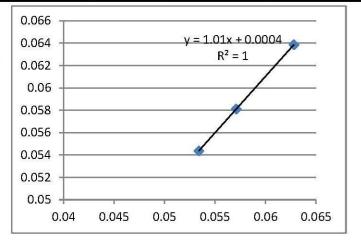
Description	: Laser Dust Monitor
Manufacturer	: Sibata Scientific Technology Ltd
Model No.	: LD-3B
Serial No.	: 235811

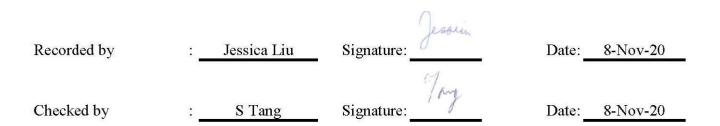
Standard Equipment

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





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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 ³)	Correction (mg/m ³)	Error of IUC Reading (%)	Expanded Uncertainty (mg/m ³)	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

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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

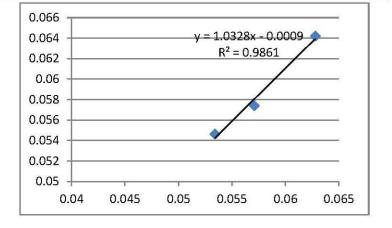
Standard Equipment

: 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	: 8- N	ov-20			
Date Calibrated	: 8- 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 ³)	Correction (mg/m ³)	Error of IUC Reading (%)	Expanded Uncertainty (mg/m ³)	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.

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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

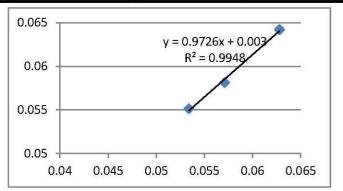
Description	: Laser Dust Monitor
Manufacturer	: Sibata Scientific Technology Ltd
Model No.	: LD-3B
Serial No.	: 567188

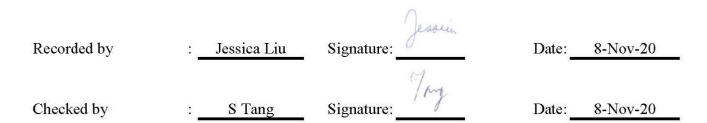
<u>Standard Equipment</u>

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
	(° 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	0.0552
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	Serial No. 2288444 61227	Expiry Date: 23-Aug-2021 24-Dec-2020		Traceat 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

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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 ³ at 4kHz	Pass	0.3	
	1 ms burst duty factor 1/10 ⁴ 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

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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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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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	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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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 So		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	Repeated burst indication		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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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 Pag						
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 frequen	cy:	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 signal: 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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综合試馬錠有限公司 SOILS & MATERIALS ENGINEERING CO., LTD. 香港黄竹坑道37號利達中心12樓 12/F., Leader Centre, 37 Wong Chuk Hang Road, Aberdeen, Hong Kong. E-mail: smec@cigismec.com Website: www.cigismec.com

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



CERTIFICATE OF CALIBRATION

Certificate No.:	20CA0616 03-02	2	Page:	1	of	2
Item tested						
Description:	Acoustical Calibr	ator (Class 1)				
Manufacturer:	Pulsar	2 - 2 - 19 - 19 - 19 - 19 - 19 - 19 - 19				
Type/Model No.:	100B					
Serial/Equipment No.:	039507					
Adaptors used:	Yes					
Item submitted by						
Customer:	Apex Testing & (Certification Ltd.				
Address of Customer:	Unit D6A, 10/F, 1	ML Tower, 3 Hoi Shin	ig Road, Tsuen Wan, N	I.T.		
Request No.:	-		o			
Date of receipt:	16-Jun-2020					
Date of test:	20-Jun-2020					
Reference equipmen	t used in the cali	bration				
Description:	Model:	Serial No.	Expiry Date:		Tracea	ble to:

Description:	Model:	Serial No.	Eurise Dates	The second second	
Star Star Star Star Star Star Star Star			Expiry Date:	Traceable to:	
Lab standard microphone	B&K 4180	2412857	11-May-2021	SCL	
Preamplifier	B&K 2673	2743150	03-Jun-2021	CEPREI	
Measuring amplifier	B&K 2610	2346941	03-Jun-2021	CEPREI	
Signal generator	DS 360	33873	19-May-2021	CEPREI	
Digital multi-meter	34401A	US36087050	19-May-2021	CEPREI	12
Audio analyzer	8903B	GB41300350	18-May-2021	CEPREI	
Universal counter	53132A	MY40003662	18-May-2021	CEPREI	

Ambient conditions

Temperature:	22 ± 1 °C
Relative humidity:	55 ± 10 %
Air pressure:	1005 ± 5 hPa

Test specifications

 The Sound Calibrator has been calibrated in accordance with the requirements as specified in IEC 60942 1997 Annex B and the lab calibration procedure SMTP004-CA-156.

2. The calibrator was tested with its axis vertical facing downwards at the specific frequency using insert voltage technique.

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

Test results

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

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





Date:

22-Jun-2020 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.

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

Hong Kong Accreditation Service (HKAS) has accredited this laboratory (Reg. No. HOKLAS 028) under the Hong Kong Laboratory Accreditation Scheme (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. This certificate shall not be reproduced except in full.



余宗 合 試 馬錠 有 限 公 司 SOILS & MATERIALS ENGINEERING CO., LTD. 香 港 黄 竹 坑 道 3 7 號 利 達 中 心 1 2 樓 12/F., Leader Centre, 37 Wong Chuk Hang Road, Aberdeen, Hong Kong. E-mail: smec@cigismec.com
Website: www.cigismec.com

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



CERTIFICATE OF CALIBRATION

(Continuation Page)

Certificate No.:

20CA0616 03-02

Page: 2 of

01

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.

Frequency Shown	Output Sound Pressure Level Setting	Measured Output Sound Pressure Level	Estimated Expanded Uncertainty
Hz	dB	dB	dB
1000	94.00	94.10	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 = 0.009 dB
Estimated expanded uncertainty	0.005 dB

3, Actual Output Frequency

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

At 1000 Hz	Actual Frequency = 997.6 Hz	
Estimated expanded uncertainty	0.1 Hz	Coverage factor k = 2.2

4, Total Noise and Distortion

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

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

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

	1	- End -	Ann
Calibrated by:	$1 \sim 1$	Checked by:	M WHH
	/ Fung Chi Yip		Shek Kwong Tat
Date:	/ 20-Jun-2020 \)	Date:	22-Jun-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.CARP156-2/Issue 1/Rev.C/01/05/2005

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