

# Certificate of Calibration

Calibration Certification Information			
Cal. Date: November 7, 2023	Rootsmeter S/N: 438320	Ta: 295	°K
Operator: Jim Tisch		Pa: 747.5	mm Hg
Calibration Model #: TE-5025A	Calibrator S/N: <b>4088</b>		

Run	Vol. Init (m3)	Vol. Final (m3)	ΔVol. (m3)	ΔTime (min)	ΔP (mm Hg)	ΔH (in H2O)
1	1	2	1	1.4450	3.3	2.00
2	3	4	1	1.0260	6.4	4.00
3	5	6	1	0.9150	8.1	5.00
4	7	8	1	0.8740	8.8	5.50
5	9	10	1	0.7210	12.8	8.00

Data Tabulation					
Vstd (m3)	Qstd (x-axis)	$\sqrt{\Delta H \left( \frac{Pa}{Pstd} \right) \left( \frac{Tstd}{Ta} \right)}$ (y-axis)	Va	Qa (x-axis)	$\sqrt{\Delta H \left( \frac{Ta}{Pa} \right)}$ (y-axis)
0.9892	0.6846	1.4097	0.9956	0.6890	0.8884
0.9851	0.9601	1.9936	0.9914	0.9663	1.2564
0.9828	1.0741	2.2289	0.9892	1.0811	1.4047
0.9819	1.1234	2.3377	0.9882	1.1307	1.4733
0.9766	1.3545	2.8193	0.9829	1.3632	1.7768
<b>QSTD</b>	m=	<b>2.10445</b>	<b>QA</b>	m=	<b>1.31777</b>
	b=	<b>-0.02941</b>		b=	<b>-0.01854</b>
	r=	<b>0.99999</b>		r=	<b>0.99999</b>

Calculations			
Vstd=	$\Delta Vol \left( \frac{Pa - \Delta P}{Pstd} \right) \left( \frac{Tstd}{Ta} \right)$	Va=	$\Delta Vol \left( \frac{Pa - \Delta P}{Pa} \right)$
Qstd=	Vstd/ΔTime	Qa=	Va/ΔTime
For subsequent flow rate calculations:			
<b>Qstd=</b> $1/m \left( \left( \sqrt{\Delta H \left( \frac{Pa}{Pstd} \right) \left( \frac{Tstd}{Ta} \right)} \right) - b \right)$		<b>Qa=</b> $1/m \left( \left( \sqrt{\Delta H \left( \frac{Ta}{Pa} \right)} \right) - b \right)$	

Standard Conditions	
Tstd:	298.15 °K
Pstd:	760 mm Hg
<b>Key</b>	
ΔH: calibrator manometer reading (in H2O)	
ΔP: rootsmeter manometer reading (mm Hg)	
Ta: actual absolute temperature (°K)	
Pa: actual barometric pressure (mm Hg)	
b: intercept	
m: slope	

RECALIBRATION
US EPA recommends annual recalibration per 1998 40 Code of Federal Regulations Part 50 to 51, Appendix B to Part 50, Reference Method for the Determination of Suspended Particulate Matter in the Atmosphere, 9.2.17, page 30



# TE-5170 Calibration Worksheet

## Site Information

<b>Location:</b> AM3A	Zones 2A at West	<b>Date:</b> 24-Oct-23
<b>Sampler:</b> TE-5170	Site ID: Kowloon Cultural	<b>Tech:</b> CS Tang
	Serial No: 4340	

## Site Conditions

<b>Barometric Pressure (in Hg):</b> 30.01	<b>Corrected Pressure (mm Hg):</b> 762
<b>Temperature (deg F):</b> 80	<b>Temperature (deg K):</b> 300
<b>Average Press. (in Hg):</b> 30.01	<b>Corrected Average (mm Hg):</b> 762
<b>Average Temp. (deg F):</b> 80	<b>Average Temp. (deg K):</b> 300

## Calibration Orifice

<b>Make:</b> Tisch	<b>Qstd Slope:</b> 2.11365
<b>Model:</b> TE-5025A	<b>Qstd Intercept:</b> -0.03408
<b>Serial#:</b> 4088	<b>Date Certified:</b> 28-Oct-22

## Calibration Information

Plate or Test #	H2O (in)	Qstd (m3/min)	I (chart)	IC (corrected)	Linear Regression
1	12.60	1.693	53.0	52.92	<b>Slope:</b> 29.7495 <b>Intercept:</b> 2.1281 <b>Corr. Coeff:</b> 0.9976  <b># of Observations:</b> 5
2	10.50	1.547	48.0	47.93	
3	7.80	1.335	41.0	40.94	
4	4.30	0.996	33.0	32.95	
5	2.20	0.717	23.0	22.96	

## Calculations

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

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

Qstd = standard flow rate  
 IC = corrected chart response  
 I = actual chart response

m = calibrator Qstd slope  
 b = calibrator Qstd intercept  
 Ta = actual temperature during calibration (deg K)  
 Pa = actual pressure during calibration (mm Hg)  
 Tstd = 298 deg K  
 Pstd = 760 mm Hg

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

m = sampler slope  
 b = sampler intercept  
 I = chart response  
 Tav = daily average temperature  
 Pav = daily average pressure

<b>Average I (chart):</b> 40
<b>Average Flow Calculation m3/min</b> 1.25754567
<b>Average Flow Calculation in CFM</b> 44.40393762
<b>Sample Time (Hrs):</b> 1.0
<b>Total Flow in m3/min</b> 75.45274021
<b>Total Flow in CFM</b> 2664.236257

**NOTE: Ensure calibration orifice has been certified within 12 months of use**



# TE-5170 Calibration Worksheet

## Site Information

<b>Location:</b> AM3A	Zones 2A at West	<b>Date:</b> 21-Dec-23
<b>Sampler:</b> TE-5170	Site ID: Kowloon Cultural	<b>Tech:</b> CS Tang
	Serial No: 4340	

## Site Conditions

<b>Barometric Pressure (in Hg):</b> 30.33	<b>Corrected Pressure (mm Hg):</b> 770
<b>Temperature (deg F):</b> 52	<b>Temperature (deg K):</b> 284
<b>Average Press. (in Hg):</b> 30.33	<b>Corrected Average (mm Hg):</b> 770
<b>Average Temp. (deg F):</b> 52	<b>Average Temp. (deg K):</b> 284

## Calibration Orifice

<b>Make:</b> Tisch	<b>Qstd Slope:</b> 2.10445
<b>Model:</b> TE-5025A	<b>Qstd Intercept:</b> -0.02941
<b>Serial#:</b> 4088	<b>Date Certified:</b> 7-Nov-23

## Calibration Information

Plate or Test #	H2O (in)	Qstd (m3/min)	I (chart)	IC (corrected)	Linear Regression
1	12.50	1.747	53.0	54.67	<b>Slope:</b> 30.1556 <b>Intercept:</b> 1.4708 <b>Corr. Coeff:</b> 0.9979  <b># of Observations:</b> 5
2	10.70	1.617	48.0	49.51	
3	7.60	1.365	41.0	42.29	
4	4.40	1.042	33.0	34.04	
5	2.30	0.757	23.0	23.72	

## Calculations

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

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

Qstd = standard flow rate  
 IC = corrected chart response  
 I = actual chart response

m = calibrator Qstd slope  
 b = calibrator Qstd intercept  
 Ta = actual temperature during calibration (deg K)  
 Pa = actual pressure during calibration (mm Hg)  
 Tstd = 298 deg K  
 Pstd = 760 mm Hg

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

m = sampler slope  
 b = sampler intercept  
 I = chart response  
 Tav = daily average temperature  
 Pav = daily average pressure

<b>Average I (chart):</b> 40
<b>Average Flow Calculation m3/min</b> 1.305789571
<b>Average Flow Calculation in CFM</b> 46.10742974
<b>Sample Time (Hrs):</b> 1.0
<b>Total Flow in m3/min</b> 78.34737424
<b>Total Flow in CFM</b> 2766.445784

**NOTE: Ensure calibration orifice has been certified within 12 months of use**



# TE-5170 Calibration Worksheet

## Site Information

<b>Location:</b> AM4A	Zones 2A at West	<b>Date:</b> 24-Oct-23
<b>Sampler:</b> TE-5170	Site ID: Kowloon Cultural	<b>Tech:</b> CS Tang
	Serial No: 3998	

## Site Conditions

<b>Barometric Pressure (in Hg):</b> 30.01	<b>Corrected Pressure (mm Hg):</b> 762
<b>Temperature (deg F):</b> 80	<b>Temperature (deg K):</b> 300
<b>Average Press. (in Hg):</b> 30.01	<b>Corrected Average (mm Hg):</b> 762
<b>Average Temp. (deg F):</b> 80	<b>Average Temp. (deg K):</b> 300

## Calibration Orifice

<b>Make:</b> Tisch	<b>Qstd Slope:</b> 2.11365
<b>Model:</b> TE-5025A	<b>Qstd Intercept:</b> -0.03408
<b>Serial#:</b> 4088	<b>Date Certified:</b> 28-Oct-22

## Calibration Information

Plate or Test #	H2O (in)	Qstd (m3/min)	I (chart)	IC (corrected)	Linear Regression
1	12.80	1.706	53.0	52.92	<b>Slope:</b> 31.7838 <b>Intercept:</b> -1.2545 <b>Corr. Coeff:</b> 0.9971  <b># of Observations:</b> 5
2	10.60	1.554	48.0	47.93	
3	7.80	1.335	41.0	40.94	
4	4.60	1.029	33.0	32.95	
5	2.70	0.792	23.0	22.96	

## Calculations

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

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

Qstd = standard flow rate  
 IC = corrected chart response  
 I = actual chart response

m = calibrator Qstd slope  
 b = calibrator Qstd intercept  
 Ta = actual temperature during calibration (deg K)  
 Pa = actual pressure during calibration (mm Hg)  
 Tstd = 298 deg K  
 Pstd = 760 mm Hg

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

m = sampler slope  
 b = sampler intercept  
 I = chart response  
 Tav = daily average temperature  
 Pav = daily average pressure

<b>Average I (chart):</b> 40
<b>Average Flow Calculation m3/min</b> 1.283479936
<b>Average Flow Calculation in CFM</b> 45.31967654
<b>Sample Time (Hrs):</b> 1.0
<b>Total Flow in m3/min</b> 77.00879616
<b>Total Flow in CFM</b> 2719.180592

**NOTE: Ensure calibration orifice has been certified within 12 months of use**



# TE-5170 Calibration Worksheet

## Site Information

<b>Location:</b> AM4A	Zones 2A at West	<b>Date:</b> 21-Dec-23
<b>Sampler:</b> TE-5170	Site ID: Kowloon Cultural	<b>Tech:</b> CS Tang
	Serial No: 3998	

## Site Conditions

<b>Barometric Pressure (in Hg):</b> 30.33	<b>Corrected Pressure (mm Hg):</b> 770
<b>Temperature (deg F):</b> 52	<b>Temperature (deg K):</b> 284
<b>Average Press. (in Hg):</b> 30.33	<b>Corrected Average (mm Hg):</b> 770
<b>Average Temp. (deg F):</b> 52	<b>Average Temp. (deg K):</b> 284

## Calibration Orifice

<b>Make:</b> Tisch	<b>Qstd Slope:</b> 2.10445
<b>Model:</b> TE-5025A	<b>Qstd Intercept:</b> -0.02941
<b>Serial#:</b> 4088	<b>Date Certified:</b> 7-Nov-23

## Calibration Information

Plate or Test #	H2O (in)	Qstd (m3/min)	I (chart)	IC (corrected)	Linear Regression
1	12.90	1.774	53.0	54.67	<b>Slope:</b> 31.4724 <b>Intercept:</b> -1.0765 <b>Corr. Coeff:</b> 0.9976  <b># of Observations:</b> 5
2	10.80	1.625	48.0	49.51	
3	7.60	1.365	41.0	42.29	
4	4.70	1.077	33.0	34.04	
5	2.70	0.819	23.0	23.72	

## Calculations

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

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

Qstd = standard flow rate  
 IC = corrected chart response  
 I = actual chart response

m = calibrator Qstd slope  
 b = calibrator Qstd intercept  
 Ta = actual temperature during calibration (deg K)  
 Pa = actual pressure during calibration (mm Hg)  
 Tstd = 298 deg K  
 Pstd = 760 mm Hg

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

m = sampler slope  
 b = sampler intercept  
 I = chart response  
 Tav = daily average temperature  
 Pav = daily average pressure

<b>Average I (chart):</b> 40
<b>Average Flow Calculation m3/min</b> 1.332090896
<b>Average Flow Calculation in CFM</b> 47.03612955
<b>Sample Time (Hrs):</b> 1.0
<b>Total Flow in m3/min</b> 79.92545377
<b>Total Flow in CFM</b> 2822.167773

**NOTE: Ensure calibration orifice has been certified within 12 months of use**



# TE-5170 Calibration Worksheet

## Site Information

<b>Location:</b> AM5A	Zones 2A at West	<b>Date:</b> 24-Oct-23
<b>Sampler:</b> TE-5170	<b>Site ID:</b> Kowloon Cultural	<b>Tech:</b> CS Tang
	<b>Serial No:</b> 4344	

## Site Conditions

<b>Barometric Pressure (in Hg):</b> 30.01	<b>Corrected Pressure (mm Hg):</b> 762
<b>Temperature (deg F):</b> 80	<b>Temperature (deg K):</b> 300
<b>Average Press. (in Hg):</b> 30.01	<b>Corrected Average (mm Hg):</b> 762
<b>Average Temp. (deg F):</b> 80	<b>Average Temp. (deg K):</b> 300

## Calibration Orifice

<b>Make:</b> Tisch	<b>Qstd Slope:</b> 2.11365
<b>Model:</b> TE-5025A	<b>Qstd Intercept:</b> -0.03408
<b>Serial#:</b> 4088	<b>Date Certified:</b> 28-Oct-22

## Calibration Information

Plate or Test #	H2O (in)	Qstd (m3/min)	I (chart)	IC (corrected)	Linear Regression
1	12.50	1.686	53.0	52.92	<b>Slope:</b> 31.7120 <b>Intercept:</b> -0.8198 <b>Corr. Coeff:</b> 0.9970  <b># of Observations:</b> 5
2	10.60	1.554	48.0	47.93	
3	7.70	1.327	41.0	40.94	
4	4.50	1.018	33.0	32.95	
5	2.60	0.778	23.0	22.96	

## Calculations

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

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

Qstd = standard flow rate  
 IC = corrected chart response  
 I = actual chart response

m = calibrator Qstd slope  
 b = calibrator Qstd intercept  
 Ta = actual temperature during calibration (deg K)  
 Pa = actual pressure during calibration (mm Hg)  
 Tstd = 298 deg K  
 Pstd = 760 mm Hg

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

m = sampler slope  
 b = sampler intercept  
 I = chart response  
 Tav = daily average temperature  
 Pav = daily average pressure

<b>Average I (chart):</b> 40
<b>Average Flow Calculation m3/min</b> 1.272681786
<b>Average Flow Calculation in CFM</b> 44.93839387
<b>Sample Time (Hrs):</b> 1.0
<b>Total Flow in m3/min</b> 76.36090717
<b>Total Flow in CFM</b> 2696.303632

**NOTE: Ensure calibration orifice has been certified within 12 months of use**



# TE-5170 Calibration Worksheet

## Site Information

<b>Location:</b> AM5A	Zones 2A at West	<b>Date:</b> 21-Dec-23
<b>Sampler:</b> TE-5170	Site ID: Kowloon Cultural	<b>Tech:</b> CS Tang
	Serial No: 4344	

## Site Conditions

<b>Barometric Pressure (in Hg):</b> 30.33	<b>Corrected Pressure (mm Hg):</b> 770
<b>Temperature (deg F):</b> 52	<b>Temperature (deg K):</b> 284
<b>Average Press. (in Hg):</b> 30.33	<b>Corrected Average (mm Hg):</b> 770
<b>Average Temp. (deg F):</b> 52	<b>Average Temp. (deg K):</b> 284

## Calibration Orifice

<b>Make:</b> Tisch	<b>Qstd Slope:</b> 2.10445
<b>Model:</b> TE-5025A	<b>Qstd Intercept:</b> -0.02941
<b>Serial#:</b> 4088	<b>Date Certified:</b> 7-Nov-23

## Calibration Information

Plate or Test #	H2O (in)	Qstd (m3/min)	I (chart)	IC (corrected)	Linear Regression
1	12.60	1.754	53.0	54.67	<b>Slope:</b> 31.4360 <b>Intercept:</b> -0.7945 <b>Corr. Coeff:</b> 0.9976  <b># of Observations:</b> 5
2	10.90	1.632	48.0	49.51	
3	7.50	1.356	41.0	42.29	
4	4.70	1.077	33.0	34.04	
5	2.60	0.804	23.0	23.72	

## Calculations

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

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

Qstd = standard flow rate  
 IC = corrected chart response  
 I = actual chart response

m = calibrator Qstd slope  
 b = calibrator Qstd intercept  
 Ta = actual temperature during calibration (deg K)  
 Pa = actual pressure during calibration (mm Hg)  
 Tstd = 298 deg K  
 Pstd = 760 mm Hg

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

m = sampler slope  
 b = sampler intercept  
 I = chart response  
 Tav = daily average temperature  
 Pav = daily average pressure

<b>Average I (chart):</b> 40
<b>Average Flow Calculation m3/min</b> 1.324665764
<b>Average Flow Calculation in CFM</b> 46.77394813
<b>Sample Time (Hrs):</b> 1.0
<b>Total Flow in m3/min</b> 79.47994584
<b>Total Flow in CFM</b> 2806.436888

**NOTE: Ensure calibration orifice has been certified within 12 months of use**



# CERTIFICATE OF ACCREDITATION

*This is to attest that*

## **AQUALITY TESTCONSULT LIMITED**

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

### **Calibration Laboratory CL-207**

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

Effective Date December 17, 2021

Expiration Date December 1, 2023



A handwritten signature in black ink, reading 'Raj Nathan'.

**President**



# SCOPE OF ACCREDITATION

International Accreditation Service, Inc.

3060 Saturn Street, Suite 100, Brea, California 92821, U.S.A. | [www.iasonline.org](http://www.iasonline.org)

MEASURED QUANTITY or DEVICE TYPE CALIBRATED	RANGE	UNCERTAINTY <sup>1,2</sup> (±)	CALIBRATION PROCEDURE AND/OR STANDARD EQUIPMENT USED
Laser Dust Meter <sup>3</sup>	Dust particles 0.001 mg/m <sup>3</sup> to 10.00 mg/m <sup>3</sup>	0.9 mg/m <sup>3</sup>	By comparison method by using reference laser dust meter
Rebound Hammer <sup>3</sup>	80 unit (hardness)	1.6 rebound count	Reference Rebound count by comparison method. BS1881: Part 202:1986; BS EN 12504-2:2001; BS EN 12504-2:2012
Mass (F2 class and coarser)	0 g to 200 g 200 g to 5 kg 5 kg to 10 kg 10 kg to 50 kg	1.3 mg 0.5 g 0.88 g 3 g	Standard Weight E2/ F1 Class & Weighing Balances by comparison method (OIML-R-111)
Weighing Scale & Balance <sup>3</sup>	0 g to 200 g 0 kg to 5 kg 0 kg to 50 kg	0.8 mg 0.13 g 7.7 g	Standard weight of E2/F1 Grade by direct measurement (OIML-R-111)
Volumetric Glassware	1 mL to 100 mL 100 mL to 1000 mL	0.004 mL 0.09 mL	Standard weight E2 Class, Weighing Balances & Distilled water by gravimetric method
<b>Thermal</b>			
Digital/Liquid in Glass Thermometers & RTD/ Thermocouples with or without Indicators	15 °C to 55 °C 55 °C to 95 °C	0.4 °C 0.9 °C	Water Baths, Reference Sensor and Indicator 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)

# 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 [International Laboratory Accreditation Cooperation Mutual Recognition Arrangement \(ILAC MRA\)](#) and the [Asia Pacific Accreditation Cooperation Mutual Recognition Arrangement \(APAC MRA\)](#) for testing, calibration, medical testing, Proficiency Testing Providers (PTP) and Reference Material Producers (RMP). Click [here](#) to view the up-to-date signatories of ILAC and [here](#) 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 v

### Mutual Recognition Arrangement (MRA) Partners for HKIAS v

 back

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

Economy	Logo	Name of Partner	URL	Test Area
United States of America		AIHA Laboratory Accreditation Programs, LLC (AIHA-LAP, LLC)	<a href="http://www.aihaaccreditedlabs.org/">http://www.aihaaccreditedlabs.org/</a>	Non-medical Testing
United States of America		American Association for Laboratory Accreditation (A2LA)	<a href="http://www.a2la.org">http://www.a2la.org</a>	Calibration, Medical Testing, Non-medical Testing, Proficiency Testing Provider, Reference Material Producer
United States of America		ANSI National Accreditation Board (ANAB)	<a href="http://www.anab.org/">http://www.anab.org/</a>	Calibration, Medical Testing, Non-medical Testing, Proficiency Testing Provider, Reference Material Producer
United States of America		International Accreditation Service Inc. (IAS)	<a href="http://www.iasonline.org/">http://www.iasonline.org/</a>	Calibration, Medical Testing, Non-medical Testing
United States of America		National Voluntary Laboratory Accreditation Program (NVLAP)	<a href="http://www.nist.gov/nvlap">http://www.nist.gov/nvlap</a>	Calibration, Non-medical Testing



東恒測試顧問有限公司

AQUALITY TESTCONSULT LIMITED

香港新界粉嶺坪輦路啟芳園11A&11B號

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

TEL : 852-3582-9589

FAX : 852-2674-1177

EMAIL : cal.aqtl@gmail.com

WEBSITE: www.aqtlgroup.com

**CERTIFICATE OF CALIBRATION**

Report Number : 230827MCA-166F  
 Date of Report : 29-Aug-23  
 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. : 235811  
 Scale Division : 0.001 mg/m<sup>3</sup>  
 Range : 0.001 to 1 mg/m<sup>3</sup>  
 Condition of Item : Normal

Date Item Received : 27-Aug-23  
 Date Calibrated : 27-Aug-23  
 Calibration Location : AQuality Calibration Lab.  
 Date of Next Calibration : 26-Aug-24  
 Calibrated By : Jessica Liu

**Test Environment**

Ambient Temperature : 29.2 °C to 30.4 °C  
 Relative Humidity : 83 % to 88 %

**Calibration Results**

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

**Remarks** :

- \* Denotes information supplied by customer.
- The results relate only to the items calibrated.
- The results apply to the items as received.
- Correction = Average of (Ref reading - IUC reading)
- The technical requirement of laser dust meter. +/- 20% error for the particles concentration.

Approved by: \_\_\_\_\_

LEE Mei Yee, Julia  
 Managing Director

The results shown in this certificate are metrologically traceable to the International System of Units (SI) or recognised measurement standards.

The certificate shall not be reproduced except in full without approval of the laboratory.



### CERTIFICATE OF CALIBRATION

Report Number : 230827MCA-166F  
Date of Report : 29-Aug-23  
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 :

<u>Equipment Number</u>	<u>Certificate Number</u>	<u>Description</u>
CH-LDM-1	HBW202201864	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

香港新界粉嶺坪輦路啟芳園11A&11B號

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

TEL : 852-3582-9589

FAX : 852-2674-1177

EMAIL : cal.aqtl@gmail.com

WEBSITE: www.aqtlgroup.com

### CERTIFICATE OF CALIBRATION

Apex Testing & Certification Ltd. Unit D6A, 10/F, TML Tower, 3 Hoi Shing Road, Tsuen Wan, N.T., HK	Test Report No.	230827MCA-166F
	Date of Issue	29-Aug-23
	Date of Testing	27-Aug-23
	Page	1 of 1

#### Item for Calibration

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

#### Standard Equipment

Description : High Volume Sampler / Calibration Orifice  
 Manufacturer : Tisch Environmental, Inc.  
 Model No. : TE-5170 / TE-5025A  
 Serial No. : 3476 / 4088  
 Last Calibration : 25-AUG-23 / 28-OCT-22

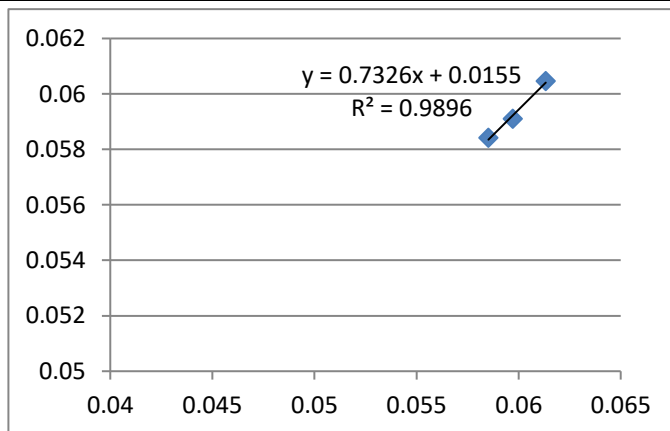
Date	Time	Mean Temp (°C)	Mean Pressure (hPa)	Concentration Standard Equipment (mg/m3)	Concentration Calibrated Equipment (mg/m3)
27-Aug-23	19:00	29.8	1003.2	0.0613	0.0605
27-Aug-23	20:05	29.8	1003.2	0.0585	0.0584
27-Aug-23	21:10	29.8	1003.2	0.0597	0.0591

By Linear Regression of Y or X

Slope (K-factor) : 0.7326

Correlation Coefficient : 0.9896

Validity of Calibration : 26-Aug-24



Recorded by : Jessica Liu

Signature: Jessica Liu

Date: 27-Aug-23

Checked by : S Tang

Signature: S Tang

Date: 27-Aug-23



東恒測試顧問有限公司

AQUALITY TESTCONSULT LIMITED

香港新界粉嶺坪輦路啟芳園11A&11B號

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

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**CERTIFICATE OF CALIBRATION**

Report Number : 230827MCA-163F  
 Date of Report : 29-Aug-23  
 Page Number : 1 of 2  
 Customer \* : Apex Testing & Certification Ltd.  
 Customer Address\* : Unit D6A, 10/F, TML Tower, 3 Hoi Shing Road, Tsuen Wan, N.T., HK  
 Customers Ref. \* : A005

**Item Under Calibration (IUC)\***

Equipment No. : N/A  
 Manufacturer : Sibata Scientific Technology Ltd  
 Model No. : LD-3B  
 Serial No. : 336338  
 Scale Division : 0.001 mg/m<sup>3</sup>  
 Range : 0.001 to 1 mg/m<sup>3</sup>  
 Condition of Item : Normal

Date Item Received : 27-Aug-23  
 Date Calibrated : 27-Aug-23  
 Calibration Location : AQuality Calibration Lab.  
 Date of Next Calibration : 26-Aug-24  
 Calibrated By : Jessica Liu

**Test Environment**

Ambient Temperature : 29.2 °C to 30.4 °C  
 Relative Humidity : 83 % to 88 %

**Calibration Results**

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

**Remarks** :

- \* Denotes information supplied by customer.
- The results relate only to the items calibrated.
- The results apply to the items as received.
- Correction = Average of (Ref reading - IUC reading)
- The technical requirement of laser dust meter. +/- 20% error for the particles concentration.

Approved by: \_\_\_\_\_

LEE Mei Yee, Julia  
 Managing Director

The results shown in this certificate are metrologically traceable to the International System of Units (SI) or recognised measurement standards.

The certificate shall not be reproduced except in full without approval of the laboratory.



### CERTIFICATE OF CALIBRATION

Report Number : 230827MCA-163F  
Date of Report : 29-Aug-23  
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 :

<u>Equipment Number</u>	<u>Certificate Number</u>	<u>Description</u>
CH-LDM-1	HBW202201864	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 -





**CERTIFICATE OF CALIBRATION**

Apex Testing & Certification Ltd. Unit D6A, 10/F, TML Tower, 3 Hoi Shing Road, Tsuen Wan, N.T., HK	Test Report No.	230827MCA-163F
	Date of Issue	29-Aug-23
	Date of Testing	27-Aug-23
	Page	1 of 1

**Item for Calibration**

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

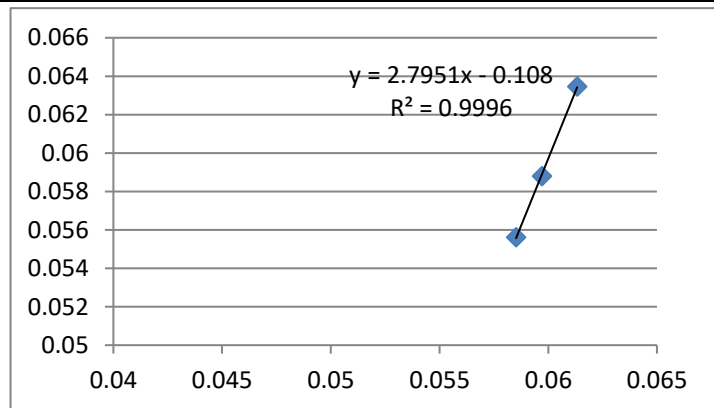
**Standard Equipment**

Description	: High Volume Sampler / Calibration Orifice
Manufacturer	: Tisch Environmental, Inc.
Model No.	: TE-5170 / TE-5025A
Serial No.	: 3476 / 4088
Last Calibration	: 25-AUG-23 / 28-OCT-22

Date	Time	Mean Temp (°C)	Mean Pressure (hPa)	Concentration Standard Equipment (mg/m3)	Concentration Calibrated Equipment (mg/m3)
27-Aug-23	19:00	29.8	1003.2	0.0613	0.0635
27-Aug-23	20:05	29.8	1003.2	0.0585	0.0556
27-Aug-23	21:10	29.8	1003.2	0.0597	0.0588

By Linear Regression of Y or X

Slope (K-factor)	: 2.7951
Correlation Coefficient	: 0.9996
Validity of Calibration	: 26-Aug-24



Recorded by : Jessica Liu Signature: Jessica Liu Date: 27-Aug-23

Checked by : S Tang Signature: S Tang Date: 27-Aug-23



東恒測試顧問有限公司

AQUALITY TESTCONSULT LIMITED

香港新界粉嶺坪輦路啟芳園11A&11B號

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**CERTIFICATE OF CALIBRATION**

Report Number : 230827MCA-165F  
 Date of Report : 29-Aug-23  
 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/m<sup>3</sup>  
 Range : 0.001 to 1 mg/m<sup>3</sup>  
 Condition of Item : Normal

Date Item Received : 27-Aug-23  
 Date Calibrated : 27-Aug-23  
 Calibration Location : AQuality Calibration Lab.  
 Date of Next Calibration : 26-Aug-24  
 Calibrated By : Jessica Liu

**Test Environment**

Ambient Temperature : 29.2 °C to 30.4 °C  
 Relative Humidity : 83 % to 88 %

**Calibration Results**

Reference True Reading (mg/m <sup>3</sup> )	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** :

- \* Denotes information supplied by customer.
- The results relate only to the items calibrated.
- The results apply to the items as received.
- Correction = Average of (Ref reading - IUC reading)
- The technical requirement of laser dust meter. +/- 20% error for the particles concentration.

Approved by: \_\_\_\_\_

LEE Mei Yee, Julia  
 Managing Director

The results shown in this certificate are metrologically traceable to the International System of Units (SI) or recognised measurement standards.

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### CERTIFICATE OF CALIBRATION

Report Number : 230827MCA-165F  
Date of Report : 29-Aug-23  
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 :

<u>Equipment Number</u>	<u>Certificate Number</u>	<u>Description</u>
CH-LDM-1	HBW202201864	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 -



**CERTIFICATE OF CALIBRATION**

Apex Testing & Certification Ltd. Unit D6A, 10/F, TML Tower, 3 Hoi Shing Road, Tsuen Wan, N.T., HK	Test Report No.	230827MCA-165F
	Date of Issue	29-Aug-23
	Date of Testing	27-Aug-23
	Page	1 of 1

**Item for Calibration**

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

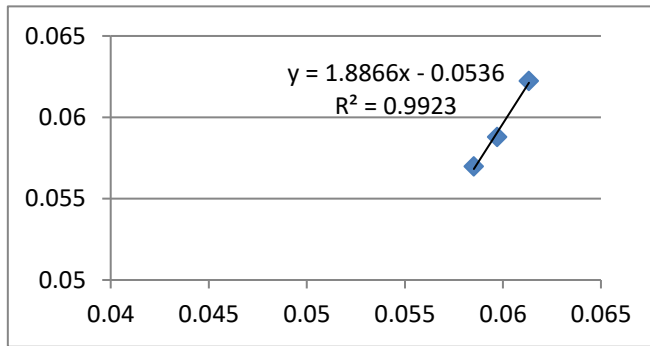
**Standard Equipment**

Description : High Volume Sampler / Calibration Orifice  
 Manufacturer : Tisch Environmental, Inc.  
 Model No. : TE-5170 / TE-5025A  
 Serial No. : 3476 / 4088  
 Last Calibration : 25-AUG-23 / 28-OCT-22

Date	Time	Mean Temp (°C)	Mean Pressure (hPa)	Concentration Standard Equipment (mg/m3)	Concentration Calibrated Equipment (mg/m3)
27-Aug-23	19:00	29.8	1003.2	0.0613	0.0622
27-Aug-23	20:05	29.8	1003.2	0.0585	0.0570
27-Aug-23	21:10	29.8	1003.2	0.0597	0.0588

By Linear Regression of Y or X

Slope (K-factor) : 1.8866  
 Correlation Coefficient : 0.9923  
 Validity of Calibration : 26-Aug-24



Recorded by : Jessica Liu Signature: Jessica Liu Date: 27-Aug-23

Checked by : S Tang Signature: S Tang Date: 27-Aug-23

## 华测计量检测有限公司

CTI MEASUREMENT AND TESTING CO., LTD.

## 校准证书

Calibration Certificate

证书编号 Certificate No.	C2310110830002	第 1 页 共 7 页 Page of
委托单位 Customer	上峰检测认证有限公司	
委托单位地址 Address	香港荃湾海盛路3号TML广场10楼D6A室	
器具名称 Name of instrument	声级计	
型号规格 Model	AWA5661	
制造商 Manufacturer	杭州爱华仪器有限公司	
出厂编号 Serial No.	301135	管理编号 Management No. -----
接收日期 Received date	2023/10/11	校准日期 Calibration date 2023/10/16
发布日期 Issue date	2023/10/20	建议下次校准日期 Next calibration date 2024/10/15



批 准 Approved by		许彦
审 核 Inspected by		刘然
校 准 Calibrated by		李少雄

总部地址：广东省深圳市宝安区西乡街道铁岗社区桃花源科技创新园B、C栋  
Building B,C, Taohuayuan Sci-Tech Innovation Park, Tiegang Community, Xixiang Sub-district, Bao'an District, Shenzhen, Guangdong, China

实验室地址：广东省深圳市宝安区西乡街道铁岗社区桃花源科技创新园B、C栋

Laboratory address :Building B and C, Taohuayuan Sci-Tech Innovation Park, Tiegang Community, Xixiang Sub-district, Bao'an District, Shenzhen, Guangdong, China

邮编：518101

电话：86-755-33682045

传真：86-755-33683385

电子邮箱：calibration@cti-cert.com

Post code

Tel.

Fax

E-mail

## 说明

### Directions

证书编号 C2310110830002  
Certificate No.

第 2 页 共 7 页  
Page of

1. 本证书校准结果均可溯源至国际单位制 (SI) 单位。

The results are traceable to International System of Units(SI).

2. 证书未盖本公司证书/报告章及骑缝章无效。未经本公司书面批准, 不得部分复制此证书。

Any certificate is deemed to be invalid without both the certificate/report seal and its across-page seal. This certificate shall not be copied partly without the written approval.

3. 本证书校准结果只与受校准仪器有关。如证书中的英文内容与中文内容有差异, 以中文为准。

The results relate only to the items calibrated. In case of any discrepancy between the English version and Chinese version of the certificate(if generated), the Chinese version shall prevail.

4. 本次校准的技术依据:

Reference documents for the calibration

JJG 188-2017 声级计检定规程

5. 本次校准所使用的主要计量标准器具:

Main measurement standards used in the calibration

名称/型号规格 Name/Model	编号 Serial No.	测量范围 Measurement range	计量特性 Technical characteristic	证书号/溯源机构 Certificate No./Traceability to	有效期 Due date
测量放大器 AWA5810D	089909	4Hz~20kHz	灵敏度: $U=0.04\text{dB}, k=2$ 频率计权: $U=0.2\text{dB}, k=2$ 线性计权: 4Hz~10Hz: $U=0.11\text{dB}, k=2$ 10Hz~ 20kHz: $U=0.04\text{dB}, k=2$	SXE202380707 广东省计量科学研究院	2024/07/25
声校准器 4231	3014336	94dB~114dB	1级	SXE202330553 广东省计量科学研究院	2024/07/30
消音箱 AWA188	080312	10Hz~20kHz (20~130) dB	$U=0.8\text{dB}, k=2$	JL2383018051 深圳市计量质量检测研究院	2024/09/20
工作标准传声器 4180	3055317	10Hz~25000Hz	$U=(0.05\sim 0.12)\text{dB}, k=2$	LSsx2023-07079 中国计量科学研究院	2024/06/05
信号发生器 AWA1650	089943	0.5Hz~20kHz	电压: $U_{\text{rel}}=0.2\%, k=2$ 频率: $U_{\text{rel}}=0.1\%, k=2$	SXE20231181 广东省计量科学研究院	2024/07/30
有源耦合腔 AWA6153S+	2006409	10Hz~400kHz	声压级: $U=0.2\text{dB}, k=2$ 失真度: $U=0.2\%, k=2$	SSD202201977 广东省计量科学研究院	2024/08/18
测试声源(扬声器) AWA5511A	090677	400Hz~20kHz	/	SSD202300428 广东省计量科学研究院	2024/07/26

## 说明

### Directions

证书编号 C2310110830002  
Certificate No.

第 3 页 共 7 页  
Page of

名称/型号规格 Name/Model	编号 Serial No.	测量范围 Measurement range	计量特性 Technical characteristic	证书号/溯源机构 Certificate No./Traceability to	有效期 Due date
声频功率放大器 AWA5871	080649	/	$U=0.03\text{dB}, k=2$	SXE202301182 广东省计量科学研究院	2024/07/30

#### 6. 校准地点、环境条件:

Place and environment condition during calibration

地点: 本实验室力学室(6)

Place

温度: 22.3°C

Temperature

相对湿度: 52%

R.H.

## 校准结果

### Results of calibration

证书编号 C2310110830002  
Certificate No.

第 4 页 共 7 页  
Page of

1. 外观及工作正常性检查  
Appearance and function check  
正常 Normal

2. 指示声级调整 (1000HZ)

声级计频率计权	声校准器频率	声校准器标准值	调校前声级计示值	调校后声级计示值	接受限	结论
	(Hz)	(dB)	(dB)	(dB)	(dB)	Pass/Fail
A	1000	94	94.0	/	93.7~94.3	Pass

3. 频率计权的声信号实验 (频率: 1000Hz/A频率计权)

声压级标准值	声压级指示值	接受限	结论
(dB)	(dB)	(dB)	Pass/Fail
54	54.4	53.2~54.8	Pass
64	64.1	63.2~64.8	Pass
74	74.1	73.2~74.8	Pass
84	84.0	83.2~84.8	Pass
94	94.0	93.2~94.8	Pass
104	104.0	103.2~104.8	Pass
114	114.1	113.2~114.8	Pass

4. 本机自生噪音

测试类型	频率计权	实测值 (dB)
声信号	A	41.7
	A	41.6
电信号	C	46.1
	Z	48.4

5. 级线性 (1dB~10dB内变化): 起始点指示声级

频率 (Hz)	测量项目	90 dB 实测值 (dB)	接受限 (dB)	结论 Pass/Fail
1000	起始点以上每间隔10dB最大偏差	+0.1	± 0.3	Pass
	起始点以下每间隔10dB最大偏差	-0.1	± 0.3	Pass
	距上限5dB内每隔1dB最大偏差	0.0	± 0.3	Pass
	距下限5dB内每隔1dB最大偏差	0.0	± 0.3	Pass
8000	起始点以上每间隔10dB最大偏差	+0.1	± 0.3	Pass
	起始点以下每间隔10dB最大偏差	0.0	± 0.3	Pass
	距上限5dB内每隔1dB最大偏差	+0.1	± 0.3	Pass
	距下限5dB内每隔1dB最大偏差	0.0	± 0.3	Pass



# 校准结果

## Results of calibration

证书编号 C2310110830002  
Certificate No.

第 5 页 共 7 页  
Page of

6. 频率计权

频率 (Hz)	A计权标准值 (dB)	声压级指示值 (dB)	接受限 (dB)	结论 Pass/Fail
20	-50.5	-50.6	-48.5~-52.5	Pass
31.5	-39.4	-39.5	-37.9~-40.9	Pass
63	-26.2	-26.2	-25.2~-27.2	Pass
125	-16.1	-16.1	-15.1~-17.1	Pass
250	-8.6	-8.6	-7.6~-9.6	Pass
500	-3.2	-3.2	-2.2~-4.2	Pass
1000	0.0	0.0	+0.7~-0.7	Pass
2000	+1.2	+1.2	+2.2~+0.2	Pass
4000	+1.0	+1.1	+2.0~0.0	Pass
8000	-1.1	-1.2	+0.4~-3.6	Pass
16000	-6.6	-9.7	-4.1~-22.6	Pass
20000	-9.3	-21.3	-6.3~-∞	Pass

频率 (Hz)	C计权标准值 (dB)	声压级指示值 (dB)	接受限 (dB)	结论 Pass/Fail
20	-6.2	-6.3	-4.2~-8.2	Pass
31.5	-3.0	-3.0	-1.5~-4.5	Pass
63	-0.8	-0.8	+0.2~-1.8	Pass
125	-0.2	-0.2	+0.8~-1.2	Pass
250	0.0	0.0	+1.0~-1.0	Pass
500	0.0	0.0	+1.0~-1.0	Pass
1000	0.0	0.0	+0.7~-0.7	Pass
2000	-0.2	-0.2	+0.8~-1.2	Pass
4000	-0.8	-0.8	+0.2~-1.8	Pass
8000	-3.0	-3.1	-1.5~-4.5	Pass
16000	-8.5	-11.6	-6.0~-24.5	Pass
20000	-11.2	-23.5	-8.2~-∞	Pass

## 校准结果

### Results of calibration

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频率 (Hz)	Z计权标准值 (dB)	声压级指示值 (dB)	接受限 (dB)	结论 Pass/Fail
20	0.0	-0.1	+2.0~-2.0	Pass
31.5	0.0	-0.1	+1.5~-1.5	Pass
63	0.0	0.0	+1.5~-1.5	Pass
125	0.0	0.0	+1.0~-1.0	Pass
250	0.0	0.0	+1.0~-1.0	Pass
500	0.0	0.0	+1.0~-1.0	Pass
1000	0.0	0.0	+0.7~-0.7	Pass
2000	0.0	0.0	+1.0~-1.0	Pass
4000	0.0	0.0	+1.0~-1.0	Pass
8000	0.0	0.0	+1.5~-2.5	Pass
16000	0.0	-0.1	+2.5~-16.0	Pass
20000	0.0	-0.3	+3.0~-∞	Pass

#### 7. 1kHz处的频率计权

A计权参考声级 (dB)	C频率计权相对A频率计权的偏差 (dB)	Z频率计权相对A频率计权的偏差 (dB)	结论 Pass/Fail	接受限 (dB)
94	0.0	-0.1	Pass	± 0.2

#### 8. F和S时间计权

衰减速率 (dB/s)	实测值 (dB/s)	接受限 (dB/s)	结论 Pass/Fail
快 (F) 计权	34.4	31.0~38.5	Pass
慢 (S) 计权	4.5	3.6~5.1	Pass

#### 9. 猝发音响应 (A计权)

猝发音持续时间 (ms)	(LAFmax-LA)标准值 (dB)	(LAFmax-LA)指示值 (dB)	接受限 (dB)	结论 Pass/Fail
200	-1.0	-1.0	-0.5~-1.5	Pass
2	-18.0	-18.0	-17.0~-18.5	Pass
0.25	-27.0	-27.1	-26.0~-30.0	Pass
猝发音持续时间 (ms)	(LASmax-LA)标准值 (dB)	(LSFmax-LA)指示值 (dB)	接受限(dB)	结论 Pass/Fail
200	-7.4	-7.4	-6.9~-7.9	Pass
2	-27.0	-27.1	-26.0~-30.0	Pass

## 校准结果

### Results of calibration



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注：仪器配传声器型号： AWA14421 ， 传声器编号： 102497

本次校准结果的扩展不确定度为：

Expanded uncertainty of measurement:

声信号：20Hz~200Hz,  $U= 0.5$  dB,  $k=2$ ; 250Hz~400Hz,  $U= 0.4$  dB,  $k=2$ ; 500Hz~1250Hz,  $U= 0.4$  dB,  $k=2$ ; 1600Hz~10000Hz,  $U= 0.6$  dB,  $k=2$ ; 12.5kHz~20kHz,  $U= 1.0$  dB;

正弦电信号：(0~140) dB, (20~20000) Hz,  $U= 0.3$  dB,  $k=2$ ;

猝发音电信号：(0~140) dB, (1000~8000) Hz, (0.25~1000)ms  $U= 0.3$  dB,  $k=2$ ;

时间计权 F 和 S: F:(25~40)dB/s,  $U= 3.2$  dB/s,  $k=2$ ; S:(1~10)dB/s,  $U= 0.3$  dB/s,  $k=2$ 。

备注：

Notes

1. 依据JJF1059.1-2012测量不确定度评定与表示。  
According to JJF1059.1-2012 Evaluation and Expression of Uncertainty in Measurement.
2. 校准项目符合1级技术要求。  
The calibrated measurand are accord with class 1 technical specifications.

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华南国家计量测试中心  
广东省计量科学研究院

SOUTH CHINA NATIONAL CENTER OF METROLOGY  
GUANGDONG INSTITUTE OF METROLOGY



中国认可  
国际互认  
校准  
CALIBRATION  
CNAS L0730

# 校准证书

## CALIBRATION CERTIFICATE

证书编号 SXE202330665  
Certificate No.

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委托方 上峰检测认证有限公司  
Client

委托方联络信息  
Contact Information

计量器具名称 声校准器  
Description

型号/规格 QC-10  
Model/Type

制造厂 QUEST  
Manufacturer

出厂编号 QI9010183  
Serial No.

设备管理编号  
Equipment No.

接收日期 2023 年 09 月 15 日  
Date of Receipt Y M D

结果 符合JJG 176-2022 (1级) 技术要求  
Results Comply with JJG 176-2022(for Class 1)

校准日期 2023 年 09 月 20 日  
Date of Calibration Y M D

批准人 李敏毅  
Approved Signatory

核 验 陈沈埋  
Reviewed by

校 准 何卓斌  
Calibrated by

证书专用章  
Stamp



扫一扫查真伪

本中心地址: 中国广州市广园中路松柏东街30号 邮政编码: 510405  
电话: (8620)86594172 传真: (8620)86590743 投诉电话: (8620)36611242 E-mail: scm@scm.com.cn  
Add: No.30, Songbai East Street, Guangyuan Middle Road, Guangzhou, Guangdong, China  
Post Code: 510405 Tel: (8620)86594172 Fax: (8620)86590743 Complaint Tel: (8620)36611242  
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# 说 明

证书编号 SXE202330665  
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## DIRECTIONS

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1. 本中心是国家市场监督管理总局在华南地区设立的国家法定计量检定机构, 本中心的质量管理体系符合 ISO/IEC 17025:2017 标准的要求。

This laboratory is the National Legal Metrological Verification Institution in southern China set up by the State Administration for Market Regulation. The quality system is in accordance with ISO/IEC 17025:2017.

2. 本中心所出具的数据均可溯源至国家计量基准和/或国际单位制(SI)。

All data issued by this laboratory are traceable to national primary standards and/or International System of Units (SI).

3. 校准地点、环境条件:

Place and environmental conditions of the calibration:

地点 声学/振动实验室 Acoustics/Vibration Lab. 温度 (25±1) °C 相对湿度 (30~40) %  
Place Temperature R.H.

4. 本次校准的技术依据:

Reference documents for the calibration:

JJG 176-2022 声校准器检定规程 V.R. of Sound Calibrators

5. 本次校准所使用的主要计量标准器具:

Major standards of measurement used in the calibration:

设备名称/型号规格/测量范围 Name of Equipment /Model/Type/Range	编号 Serial No.	证书号/有效期/溯源单位 Certificate No./Due Date /Traceability to	计量特性 Metrological Characteristic
实验室标准传声器 Lab Standard Microphones /4180/(10~25600)Hz	2889895	LSsx2022-08290 /2023-09-20 /国家计量院	声压灵敏度级: $U=(0.05\sim0.12)$ dB ( $k=2$ ) Sound pressure sensitivity level: $U=(0.05\sim0.12)$ dB ( $k=2$ )
动态信号分析仪 Dynamical Signal Analyzer /3560C (3110模块) /0.1 Hz~200 kHz	2392397	SXE202300516 /2024-04-18 /本中心	电压: $U_{ei}=0.2\%$ , 频率: $U_{ei}=0.002\%$ ( $k=2$ ) Voltage: $U_{ei}=0.2\%$ , Frequency: $U_{ei}=0.002\%$ ( $k=2$ )
自动失真仪 Automatic Distortion Meter Calibrator /ZQ4121A/0.01%~30%	00297	WWD202301557 /2024-05-09 /本中心	$\pm 10\%$

注: 1. 本证书校准结果只与受校准仪器有关。 The results relate only to the items calibrated.

Note: 2. 未经本机构书面批准, 不得部分复制此证书。 This certificate shall not be reproduced except in full, without the written approval of our laboratory.

3. “委托方”、“委托方联络信息”由委托方提供, “制造厂”、“型号规格”、“出厂编号”以及“设备编号”为仪器上标注, 委托方对上面内容如有异议, 须在收到证书后二十个工作日内提出。

The information Client and Contact Information are provided by client, and the Manufacturer, Model/Type, Serial No. and Equipment No. are marked on the items. Client shall submit any objection within 20 working days after receiving the certificate for the information above.

4. 本次校准日期视为发布日期。 The calibration date is the date of issue of the certificate.



## 校准结果 RESULTS OF CALIBRATION

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1 外观: 符合要求

Apparent inspection: Pass

2 声压级: 见表1

Sound Pressure Level: Shown in table 1

表1 Table 1

频率/Hz	标称值/dB	实测值/dB	接受限/dB	结论
Frequency	Nominal Value	Measured Value	Acceptance limit	Conclusion
1000	114	114.10	$\pm 0.25$	符合要求(Pass)

3 频率: 见表2

Frequency: Shown in table 2

表2 Table 2

标称值/Hz	实测值/Hz	接受限/%	结论
Nominal Value	Measured Value	Acceptance limit	Conclusion
1000	1001.09	$\pm 0.7$	符合要求(Pass)

4 总失真+噪声: 见表3

Total distortion + noise: Shown in table 3

表3 Table 3

频率/Hz	声压级/dB	总失真+噪声/%	接受限/%	结论
Frequency	Sound Pressure Level	Total Distortion+ noise	Acceptance limit	Conclusion
1000	114	0.2	$\leq 2.5$	符合要求(Pass)



## 校准结果 RESULTS OF CALIBRATION

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说明:

Note:

1 测量结果扩展不确定度:

Expanded uncertainty of measurement results:

声压级:  $U=0.15$  dB

Sound Pressure Level

频率:  $U_{rel}=0.1\%$

Frequency

总失真+噪声:  $U=0.4\%$

Total distortion + noise

包含因子:  $k=2$

Coverage factor

2 本证书中给出的扩展不确定度依据JJF1059.1-2012《测量不确定度评定与表示》评定,由合成标准不确定度乘以包含概率约为95%时对应的包含因子 $k$ 得到。

The expanded uncertainty given in this certificate is evaluated according to JJF 1059.1-2012 "Evaluation and Expression of Uncertainty in Measurement", which is obtained by multiplying the combined standard uncertainty by the coverage factor  $k$  corresponding to the coverage probability of about 95%.

3 校准结果符合性判定依据JJF 1094-2002《测量仪器特性评定》之5.3.1和JJG 176-2022《声校准器检定规程》。Decision rules of conformity are JJF 1094-2002 *Evaluation of the Characteristics of Measuring Instruments* (5.3.1) and JJG 176-2022 *V.R. of Sound Calibrators*.

4 结论:被校准仪器校准结果符合JJG 176-2022(1级)全部后续项目技术要求。

Conclusion: The data of instrument calibrated comply with the technical characteristics of all subsequent items in JJG 176-2022 (for Class 1).

5 按照所依据技术文件的规定,建议复校时间间隔不超过1年。更换重要部件、维修或对仪器性能有怀疑时,应及时校准。

According to the demand of reference document, next calibration is proposed within 1 year. In case of replacement of important parts, maintenance or doubt on the performance of the instrument, it shall be calibrated in time.