

High-Volume TSP Sampler
5-Point Calibration Record

Location : AM1(ICC)
 Calibrated by : K.T.Ho
 Date : 16/10/2015

Sampler

Model : TE-5170
 Serial Number : S/N 0767

Calibration Orifice and Standard Calibration Relationship

Serial Number : 2454
 Service Date : 14 Mar 2015
 Slope (m) : 2.09532
 Intercept (b) : -0.03812
 Correlation Coefficient(r) : 0.99994

Standard Condition

Pstd (hpa) : 1013
 Tstd (K) : 298.18

Calibration Condition

Pa (hpa) : 1013
 Ta(K) : 301

Resistance Plate	dH [green liquid] (inch water)	Z	X=Qstd (cubic meter/min)	IC (chart)	Y (corrected)
1 18 holes	10.2	3.186	1.539	60	59.86
2 13 holes	8.4	2.891	1.398	53	52.88
3 10 holes	6.2	2.484	1.204	44	43.90
4 7 holes	4.4	2.093	1.017	36	35.92
5 5 holes	2.6	1.609	0.786	24	23.94

Notes: $Z = \sqrt{dH(Pa/Pstd)(Tstd/Ta)}$, $X = Z/m - b$, $Y(\text{Corrected Flow}) = IC * \{\sqrt{Pa/Pstd}(Tstd/Ta)\}$

Sampler Calibration Relationship

Slope(m): 47.088 Intercept(b): -12.676

Correlation Coefficient(r): 0.9995

Checked by: 
 Magnum Fan

Date: 02/11/2015

High-Volume TSP Sampler
5-Point Calibration Record

Location : AM1(ICC)
 Calibrated by : K.T.Ho
 Date : 16/12/2015

Sampler

Model : TE-5170
 Serial Number : S/N 0767

Calibration Orifice and Standard Calibration Relationship

Serial Number : 2454
 Service Date : 14 Mar 2015
 Slope (m) : 2.09532
 Intercept (b) : -0.03812
 Correlation Coefficient(r) : 0.99994

Standard Condition

Pstd (hpa) : 1013
 Tstd (K) : 298.18

Calibration Condition

Pa (hpa) : 1026
 Ta(K) : 288


Resistance Plate	dH [green liquid] (inch water)	Z	X=Qstd (cubic meter/min)	IC (chart)	Y (corrected)
1 18 holes	10.0	3.237	1.563	58	59.38
2 13 holes	8.2	2.931	1.417	51	52.21
3 10 holes	6.0	2.508	1.215	42	43.00
4 7 holes	4.2	2.098	1.019	34	34.81
5 5 holes	2.4	1.586	0.775	22	22.52

Notes: $Z = \sqrt{dH(Pa/Pstd)(Tstd/Ta)}$, $X = Z/m - b$, $Y(\text{Corrected Flow}) = IC * \{\sqrt{Pa/Pstd}(Tstd/Ta)\}$

Sampler Calibration Relationship

Slope(m): 46.178 Intercept(b): -12.939

Correlation Coefficient(r): 0.9996

Checked by: 
 Magnum Fan

Date: 21/12/2015

High-Volume TSP Sampler
5-Point Calibration Record

Location : AM2 (Harbourside)
 Calibrated by : K.T.Ho
 Date : 17/10/2015

Sampler

Model : TE-5170
 Serial Number : S/N 8919

Calibration Orifice and Standard Calibration Relationship

Serial Number : 2454
 Service Date : 14 Mar 2015
 Slope (m) : 2.09532
 Intercept (b) : -0.03812
 Correlation Coefficient(r) : 0.99994

Standard Condition

Pstd (hpa) : 1013
 Tstd (K) : 298.18

Calibration Condition

Pa (hpa) : 1013
 Ta(K) : 301

Resistance Plate	dH [green liquid] (inch water)	Z	X=Qstd (cubic meter/min)	IC (chart)	Y (corrected)
1 18 holes	12.2	3.485	1.681	60	59.86
2 13 holes	9.2	3.026	1.462	52	51.88
3 10 holes	7.2	2.677	1.296	44	43.90
4 7 holes	4.6	2.140	1.039	34	33.92
5 5 holes	2.6	1.609	0.786	24	23.94

Notes: $Z = \sqrt{dH(Pa/Pstd)(Tstd/Ta)}$, $X = Z/m - b$, $Y(\text{Corrected Flow}) = IC * \{\sqrt{Pa/Pstd}(Tstd/Ta)\}$

Sampler Calibration Relationship

Slope(m): 40.493 Intercept(b): -8.037 Correlation Coefficient(r): 0.9994

Checked by: 
 Magnum Fan

Date: 20/10/2015

High-Volume TSP Sampler
5-Point Calibration Record

Location : AM2 (Harbourside)
 Calibrated by : K.T.Ho
 Date : 16/12/2015

Sampler

Model : TE-5170
 Serial Number : S/N 8919

Calibration Orifice and Standard Calibration Relationship

Serial Number : 2454
 Service Date : 14 Mar 2015
 Slope (m) : 2.09532
 Intercept (b) : -0.03812
 Correlation Coefficient(r) : 0.99994

Standard Condition

Pstd (hpa) : 1013
 Tstd (K) : 298.18

Calibration Condition

Pa (hpa) : 1026
 Ta(K) : 288

Resistance Plate	dH [green liquid] (inch water)	Z	X=Qstd (cubic meter/min)	IC (chart)	Y (corrected)
1 18 holes	12.0	3.546	1.711	58	59.38
2 13 holes	9.0	3.071	1.484	50	51.19
3 10 holes	7.0	2.709	1.311	43	44.02
4 7 holes	4.4	2.147	1.043	34	34.81
5 5 holes	2.4	1.599	0.775	24	24.57

Notes: $Z = \sqrt{dH(Pa/Pstd)(Tstd/Ta)}$, $X = Z/m - b$, $Y(\text{Corrected Flow}) = IC * \{\sqrt{Pa/Pstd}(Tstd/Ta)\}$

Sampler Calibration Relationship

Slope(m): 37.152 Intercept(b): -4.194 Correlation Coefficient(r): 0.9997

Checked by: 
 Magnum Fan

Date: 21/12/2015



SIBATA SCIENTIFIC TECHNOLOGY LTD.

1-1-62, Nakane, Soka, Saitama, 340-0005 Japan

TEL : 048-933-1582 FAX : 048-933-1591

CALIBRATION CERTIFICATE

Date: May 28, 2015

Equipment Name	:	Digital Dust Indicator, Model LD-3B
Code No.	:	080000-42
Quantity	:	1 unit
Serial No.	:	2Z6240
Sensitivity	:	0.001 mg/m ³
Sensitivity Adjustment	:	570CPM
Scale Setting	:	May 25, 2015

We hereby certify that the above mentioned instrument has been calibrated satisfactory.

Sincerely

SIBATA SCIENTIFIC TECHNOLOGY LTD.

Kentaro Togo
Overseas Sales Division



TEST CERTIFICATE

CUSTOMER : INNOTECH INSTRUMENTATION CO.LTD.



SIBATA SCIENTIFIC TECHNOLOGY LTD.

Report No. 15-0798

DATE 26/May /2015

APPROVE BY 	VERIFIED BY 	ISSUED BY
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PRODUCT NAME	: Digital Dust Indicator
MODEL NUMBER	: LD-3B
SERIAL NUMBER	: 2Z6240
CALIBRATION DATE	: 25-May-2015

Testing Category	Judging Standard	Judgment	Inspection chart				
Function Test	Switch, Display, Wiring will normally function	OK	Reference Value(S)				
Sensitivity Calibration	Count is $\pm 2\%$ accurate to the master by the standard calibration particle		570 CPM				
Dust Concentration Measuring	Count is $\pm 10\%$ accurate to the master under the 3 different concentration.						
Stability	The maximum value of the sensitivity adjustment scale setting value of the machine and the difference with minimum value are within 5% compared with the maximum value. (The measurement is repeated three times for one minute.)	OK					
Synthetic Judgment			Good				
			<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%;">Temperature</td> <td style="width: 50%;">Humidity</td> </tr> <tr> <td style="text-align: center;">23 °C</td> <td style="text-align: center;">45 %</td> </tr> </table>	Temperature	Humidity	23 °C	45 %
Temperature	Humidity						
23 °C	45 %						

Equipment Verification Report (TSP)

Equipment Calibrated:

Type: Laser Dust monitor
 Manufacturer: Sibata LD-3B
 Serial No. 2Z6240
 Equipment Ref: Nil
 Job Order HK1520162

Standard Equipment:

Standard Equipment: Higher Volume Sampler
 Location & Location ID: AUES office (calibration room)
 Equipment Ref: HVS 018
 Last Calibration Date: 13 May 2015

Equipment Verification Results:

Testing Date: 22 & 23 June 2015

Hour	Time	Mean Temp °C	Mean Pressure (hPa)	Concentration in mg/m ³ (Standard Equipment)	Total Count (Calibrated Equipment)	Count/Minute (Total Count/60min)
2hr18min	12:45 ~ 15:03	27.9	1003.2	0.010	1171	8.5
2hr25min	15:08 ~ 17:33	27.9	1003.2	0.023	2290	15.7
2hr43min	9:45 ~ 12:28	27.3	1003.9	0.014	1908	11.7

Sensitivity Adjustment Scale Setting (Before Calibration) 569 (CPM)

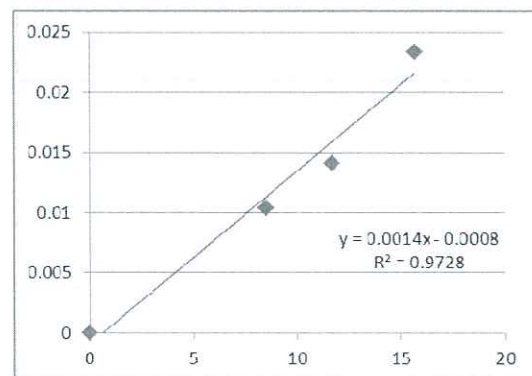
Sensitivity Adjustment Scale Setting (After Calibration) 574 (CPM)

Linear Regression of Y or X

Slope (K-factor): 0.0014

Correlation Coefficient 0.9863

Date of Issue 24 June 2015



Remarks:

- Strong** Correlation ($R > 0.8$)
- Factor 0.0014 should be apply for TSP monitoring

*If $R < 0.5$, repair or re-verification is required for the equipment

Operator : Donald Kwok Signature : [Signature] Date : 24 June 2015

QC Reviewer : Ben Tam Signature : [Signature] Date : 24 June 2015



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ORIFICE TRANSFER STANDARD CERTIFICATION WORKSHEET TE-5025A

Date - Mar 24, 2015 Rootsmeter S/N 0438320 Ta (K) - 292
 Operator Tisch Orifice I.D. - 2454 Pa (mm) - 756.92

PLATE OR Run #	VOLUME START (m3)	VOLUME STOP (m3)	DIFF VOLUME (m3)	DIFF TIME (min)	METER DIFF Hg (mm)	ORFICE DIFF H2O (in.)
1	NA	NA	1.00	1.4460	3.2	2.00
2	NA	NA	1.00	1.0300	6.4	4.00
3	NA	NA	1.00	0.9180	7.9	5.00
4	NA	NA	1.00	0.8780	8.7	5.50
5	NA	NA	1.00	0.7240	12.6	8.00

DATA TABULATION

Vstd	(x axis) Qstd	(y axis)	Va	(x axis) Qa	(y axis)
1.0121	0.6999	1.4258	0.9958	0.6886	0.8784
1.0078	0.9785	2.0163	0.9916	0.9627	1.2422
1.0057	1.0955	2.2543	0.9895	1.0779	1.3888
1.0047	1.1443	2.3644	0.9885	1.1258	1.4566
0.9994	1.3805	2.8515	0.9833	1.3582	1.7568
Qstd slope (m) =		2.09532	Qa slope (m) =		1.31205
intercept (b) =		-0.03812	intercept (b) =		-0.02349
coefficient (r) =		0.99994	coefficient (r) =		0.99994
y axis = SQRT[H2O(Pa/760) (298/Ta)]			y axis = SQRT[H2O(Ta/Pa)]		

CALCULATIONS

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

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

For subsequent flow rate calculations:

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