JBW

CERTIFICATE OF CALIBRATION

FINAL DATA

NIST*-Traceable Certification for SAS Air Sampler

*National Institute of Standards and Technology

Model: SUPER " 90 "

Date: 8-22-19

Serial No. : 97/D 22645 w/ss head 8519

Next Cal. Due: 8-22-20

Company: Aerobiology Laboratory

ID: Aero #4

Cal. Technician:

Checked by:

Temperature, °F: 70

Barometric Pressure, in. Hg: 30.0

Temp. and Pressure Correction Factor: 1.0

Anemometer Reading, meters/second: .257

Corrected Air Velocity, meters/second: .257

Air Flow, liters/minute: 90.0

Display Setting (Sample Volume)	Sampling Time (Minutes)	
100 liters:	1.1	Minutes
500 liters:	5.5	Minutes
1000 liters:	11.0	Minutes

Comments:

1. **Accuracy = ± 5% Total**
2. **Calibrated at battery output** 9.5 **volts.**
3. **Calibrated with contact plate in place.** Hardy TSA Petri

   Lot G60-443133 Exp. 10-18-19
4. **Anemometer serial number** T95451921005 **(see attached certificate of calibration).**

JBW & Associates, Inc.
10242 Little Rock Lane
Frederick, Maryland 21702

Bioscience International
Telephone: 301-230-0072

JBW

CERTIFICATE OF VALIDATION

AS FOUND DATA

NIST*-Traceable Certification for SAS Air Sampler

*National Institute of Standards and Technology

Model: SUPER " 90 " **Date:** 8-22-19

Serial No.: 97/D 22645 w/ss head 8519 **Val. Technician:** J. B. Wilkinson

Company: Aerobiology Laboratory **Checked by:** D. Peterson

ID: Aero #4

Temperature, °F: 70

Barometric Pressure, in. Hg: 30.0

Temp. and Pressure Correction Factor: 1.0

Anemometer Reading, meters/second: .267

Corrected Air Velocity, meters/second: .267

Air Flow, liters/minute: 93.5

Display Setting (Sample Volume)	Sampling Time (Minutes)
100 liters:	1.1 Minutes
500 liters:	5.5 Minutes
1000 liters:	11.0 Minutes

Comments:

1. Accuracy = ± 5% Total
2. Validated at battery output 9.8 volts.
3. Validated with contact plate in place. Hardy TSA Petri
   Lot G60-443133 Exp. 10-18-19
4. Anemometer serial number T95451921005 (see attached certificate of calibration).

JBW & Associates, Inc.
10242 Little Rock Lane
Frederick, Maryland 21702

Bioscience International
Telephone: 301-230-0072

TSI P/N 2300157

CERTIFICATE OF CALIBRATION AND TESTING

TSI Incorporated, 500 Cardigan Road, Shoreview, MN 55126 USA
Tel: 1-800-874-2811 1-651-490-2811 Fax: 1-651-490-3824 http://www.tsi.com

ENVIRONMENT CONDITIONS		
TEMPERATURE	74.4 (23.6)	°F (°C)
RELATIVE HUMIDITY	27	%RH
BAROMETRIC PRESSURE	29.17 (987.8)	inHg (hPa)

MODEL	9545
SERIAL NUMBER	T95451921005

☒ AS LEFT ☒ IN TOLERANCE
☐ AS FOUND ☐ OUT OF TOLERANCE

– CALIBRATION VERIFICATION RESULTS –

TEMPERATURE VERIFICATION			SYSTEM T-100			Unit: °F (°C)
#	STANDARD	MEASURED	ALLOWABLE RANGE	#	STANDARD	MEASURED	ALLOWABLE RANGE
1	32.0 (0.0)	32.3 (0.2)	31.5~32.5 (−0.3~0.3)	2	140.0 (60.0)	140.2 (60.1)	139.5~140.5 (59.7~60.3)

HUMIDITY VERIFICATION			SYSTEM H-100			Unit: %RH
#	STANDARD	MEASURED	ALLOWABLE RANGE	#	STANDARD	MEASURED	ALLOWABLE RANGE
1	10.0	10.1	7.8~12.2	4	70.0	69.4	67.8~72.2
2	30.0	29.2	27.8~32.2	5	90.0	89.6	87.8~92.2
3	50.0	49.3	47.8~52.2				

VELOCITY VERIFICATION			SYSTEM V-109			Unit: ft/min (m/s)
#	STANDARD	MEASURED	ALLOWABLE RANGE	#	STANDARD	MEASURED	ALLOWABLE RANGE
1	0 (0.00)	0 (0.00)	−3~3 (−0.02~0.02)	7	639 (3.24)	641 (3.25)	620~658 (3.15~3.34)
2	35 (0.18)	35 (0.18)	32~38 (0.16~0.19)	8	984 (5.00)	982 (4.99)	954~1013 (4.85~5.15)
3	65 (0.33)	64 (0.33)	62~68 (0.31~0.34)	9	1466 (7.44)	1469 (7.46)	1422~1509 (7.22~7.67)
4	100 (0.51)	99 (0.50)	97~102 (0.49~0.52)	10	2497 (12.69)	2502 (12.71)	2422~2572 (12.31~13.07)
5	159 (0.81)	160 (0.81)	155~164 (0.78~0.83)	11	4500 (22.86)	4526 (22.99)	4365~4635 (22.18~23.55)
6	327 (1.66)	328 (1.67)	317~337 (1.61~1.71)	12	5800 (29.46)	5798 (29.45)	5626~5974 (28.58~30.35)

TSI does hereby certify that the above described instrument conforms to the original manufacturer's specification (not applicable to As Found data) and has been calibrated using standards whose accuracies are traceable to the United States National Institute of Standards and Technology (NIST) or has been verified with respect to instrumentation whose accuracy is traceable to NIST, or is derived from accepted values of physical constants. TSI's calibration system is registered to ISO-9001:2015.

Measurement Variable	System ID	Last Cal.	Cal. Due
Temperature	E003617	01-14-19	07-31-19
Humidity	E003296	08-15-18	08-31-19
Pressure	E001557	04-17-19	10-31-19
Temperature	E001553	04-11-19	10-31-19

Measurement Variable	System ID	Last Cal.	Cal. Due
Temperature	E003305	01-14-19	07-31-19
Pressure	E010288	05-20-19	11-30-19
DC Voltage	E005749	08-23-18	08-31-19
Velocity	E005916	08-14-17	08-31-20

CALIBRATED

May 21, 2019
DATE

Doc. ID: CERT_DEFAULT

ACCREDITED
A2LA Certificate No. 1750.01
Calibration

Calibration complies with ISO/IEC 17025, ANSI/NCSL Z540-1, and 9001

Cert. No.: 1015-9767818

Traceable® Certificate of Calibration for Stopwatch

Manufactured for and distributed by : VWR International LLC Radnor Corporate Center, Bldg 1,Ste 200, 100 Matsonford Road,Radnor,PA,19087

Instrument Identification:

Model: 62379-058, S/N: 181557362 Manufacturer: Control Company

Standards/Equipment:

Description	Serial Number	Due Date	NIST Traceable Reference
Non-Contact Frequency Counter	26.66887	17 May 2019	1000425907

Certificate Information:

Technician: 332 Procedure: CAL-01 Cal Date: 30 Aug 2018 Cal Due Date: 30 Aug 2020

Test Conditions: 64.69%RH 23.62°C 1016mBar

Calibration Data: (New Instrument)

Unit(s)	Nominal	As Found	In Tol	Nominal	As Left	In Tol	Min	Max	±U	TUR
sec/24hr	N.A.	N.A.		0.000	-0.100	Y	-0.432	0.432	0.041	>4:1

This certificate indicates Traceability to standards provided by (NIST) National Institute of Standards and Technology and/or a National Standards Laboratory.

A Test Uncertainty Ratio of at least 4:1 is maintained unless otherwise stated and is calculated using the expanded measurement uncertainty. Uncertainty evaluation includes the instrument under test and is calculated in accordance with the ISO "Guide to the Expression of Uncertainty in Measurement : (GUM). The uncertainty represents an expanded uncertainty using a coverage factor k=2 to approximate a 95% confidence level. In tolerance conditions are based on test results falling within specified limits with no reduction by the uncertainty of the measurement. The results contained herein relate only to the item calibrated. This certificate shall not be reproduced except in full, without written approval of Control Company.

Nominal=Standard's Reading; As Left=Instrument's Reading; In Tol=In Tolerance; Min/Max=Acceptance Range; ± U=Expanded Measurement Uncertainty; TUR=Test Uncertainty Ratio; Accuracy=±(Max-Min)/2; Min=As Left Nominal(Rounded) – Tolerance; Max= As Left Nominal(Rounded) + Tolerance;

Nicol Rodriguez, Quality Manager

Aaron Jurica, Technical Manager

Note :

Maintaining Accuracy:

In our opinion once calibrated your Stopwatch should maintain its accuracy. There is no exact way to determine how long calibration will be maintained. Stopwatch change little, if any at all, but can be affected by aging, temperature, shock, and contamination.

Recalibration:

For factory calibration and re-certification traceable to National Institute of Standards and Technology contact Control Company.

CONTROL COMPANY 12554 Galveston RD Suite B230 Webster TX USA 77598
Phone 281 482-1714 Fax 281 482-9448 sales@control3.com www.control3.com