

JBW

CERTIFICATE OF VALIDATION

AS FOUND DATA

NIST*-Traceable Certification for SAS Air Sampler

*National Institute of Standards and Technology

Model: SUPER " 100 "

Date: 1-24-19

Serial No.: 14-D-09349 w/ss head 27748

Val. Technician: *M. Short*

Company: Aerobiology Laboratory

Checked by: *J. B. White*

Temperature, °F: 70

Barometric Pressure, in. Hg: 29.9

Temp. and Pressure Correction Factor: .996

Anemometer Reading, meters/second: .285

Corrected Air Velocity, meters/second: .284

Air Flow, liters/minute: 100.0

Display Setting (Sample Volume)	Sampling Time (Minutes)	
100 liters:	1.0	Minutes
500 liters:	5.0	Minutes
1000 liters:	10.0	Minutes

- Comments:
1. Accuracy = ± 5% Total
 2. Validated at battery output 9.9 volts.
BBL TSA Petri
 3. Validated with contact plate in place. Lot 8259521 Exp. 2-25-19
 4. Anemometer serial number 66050014 (see attached certificate of calibration).

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

Bioscience International
 Telephone: 301-230-0072

JBW

CERTIFICATE OF CALIBRATION

FINAL DATA

NIST*-Traceable Certification for SAS Air Sampler

*National Institute of Standards and Technology

Model: SUPER " 100 "

Date: 1-24-19

Serial No. : 14-D-09349 w/ss head 27748

Next Cal. Due: 1-24-20

Company: Aerobiology Laboratory

Cal. Technician: [Signature]

Checked by: [Signature]

Temperature, °F: 70

Barometric Pressure, in. Hg: 29.9

Temp. and Pressure Correction Factor: .996

Anemometer Reading, meters/second: .285

Corrected Air Velocity, meters/second: .284

Air Flow, liters/minute: 100.0

Display Setting (Sample Volume)	Sampling Time (Minutes)
100 liters:	1.0 Minutes
500 liters:	5.0 Minutes
1000 liters:	10.0 Minutes

Comments:

- Accuracy = ± 5% Total
- Calibrated at battery output 9.5 volts. BBL TSA Petri
- Calibrated with contact plate in place. Lot 8259521 Exp. 2-25-19
- Anemometer serial number 66050014 (see attached certificate of calibration).

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 Frederick, Maryland 21702

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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			MODEL	8455-12
TEMPERATURE	73.9 (23.3)	°F (°C)	SERIAL NUMBER	66050014
RELATIVE HUMIDITY	52	%RH		
BAROMETRIC PRESSURE	29.11 (985.8)	mHg (hPa)		

AS LEFT IN TOLERANCE
 AS FOUND OUT OF TOLERANCE

- CALIBRATION VERIFICATION RESULTS -

VELOCITY VERIFICATION			SYSTEM V-110			Unit: ft/min (m/s)	
WITH RANGE = 0 - 200.0 STD FT/MIN, 0 - 1.0 STD M/S							
#	STANDARD	MEASURED	ALLOWABLE RANGE	#	STANDARD	MEASURED	ALLOWABLE RANGE
1	0 (0.00)	0 (0.00)	-1-1 (-0.01-0.01)	5	72 (0.36)	71 (0.36)	69-74 (0.35-0.38)
2	25 (0.13)	25 (0.13)	23-26 (0.12-0.13)	6	112 (0.57)	112 (0.57)	109-116 (0.55-0.59)
3	37 (0.19)	38 (0.19)	36-39 (0.18-0.20)	7	170 (0.86)	169 (0.86)	165-174 (0.84-0.88)
4	53 (0.27)	53 (0.27)	51-55 (0.26-0.28)				

VELOCITY VERIFICATION			SYSTEM V-110			Unit: ft/min (m/s)	
WITH RANGE = 0 - 1000.0 STD FT/MIN, 0 - 5.0 STD M/S							
#	STANDARD	MEASURED	ALLOWABLE RANGE	#	STANDARD	MEASURED	ALLOWABLE RANGE
1	252 (1.28)	253 (1.28)	242-262 (1.23-1.33)	3	527 (2.68)	524 (2.66)	511-542 (2.60-2.75)
2	379 (1.93)	377 (1.92)	367-392 (1.86-1.99)	4	716 (3.63)	714 (3.63)	696-735 (3.54-3.73)

VELOCITY VERIFICATION			SYSTEM V-110			Unit: ft/min (m/s)	
WITH RANGE = 0 - 10000.0 STD FT/MIN, 0 - 50.0 STD M/S							
#	STANDARD	MEASURED	ALLOWABLE RANGE	#	STANDARD	MEASURED	ALLOWABLE RANGE
1	1119 (5.69)	1127 (5.72)	1047-1192 (5.32-6.05)	5	5279 (26.82)	5244 (26.64)	5123-5434 (26.03-27.61)
2	1679 (8.53)	1677 (8.52)	1596-1763 (8.11-8.95)	6	7198 (36.57)	7157 (36.36)	7004-7392 (35.58-37.55)
3	2526 (12.83)	2541 (12.91)	2425-2627 (12.32-13.34)	7	8985 (45.64)	8990 (45.67)	8755-9215 (44.48-46.81)
4	3785 (19.23)	3766 (19.13)	3659-3910 (18.59-19.86)				

Tolerance : ± 2.0% of reading, ± 0.5% of full scale of selected range
 Std Conditions : Temperature : 21.1°C Barometric Pressure : 760.0 mmHg

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	Measurement Variable	System ID	Last Cal.	Cal. Due
DC Voltage	E001658	02-01-18	08-31-19	Temperature	E004102	05-21-18	11-30-18
Pressure	E001719	04-11-18	10-31-18	Pressure	E001721	04-11-18	10-31-18
Velocity	E005916	08-14-17	08-31-20				

Chao Vang
CALIBRATED

September 4, 2018

DATE



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



Cert. No.: 1045-9556373

Traceable® Certificate of Calibration for Water-/Shock-Resistant Stopwatch

Manufactured for and distributed by: Control Company 12554 Galveston Rd B230, Webster, TX 77598

Instrument Identification:

Model: 1045, S/N: 181349883 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: 353 Procedure: CAL-01 Cal Date: 11 Jun 2018 Cal Due Date: 11 Jun 2020
Test Conditions: 64.93%RH 23.46°C 1011mBar

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	-0.967	Y	-8.64	8.64	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 Justice, Technical Manager

Maintaining Accuracy:

In our opinion once calibrated your Water-/Shock-Resistant Stopwatch should maintain its accuracy. There is no exact way to determine how long calibration will be maintained. Water-/Shock-Resistant 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

Control Company is an ISO/IEC 17025:2005 Calibration Laboratory Accredited by (A2LA) American Association for Laboratory Accreditation, Certificate No. 1750.01.
Control Company is ISO 9001:2008 Quality Certified by DNV GL, Certificate No. CERT-01805-2006-AQ-HOU-RvA.
International Laboratory Accreditation Cooperation (ILAC) - Multilateral Recognition Arrangement (MRA).