

# BIOSCIENCE INTERNATIONAL

Innovative Microbiology Products  
 11333 Woodglen Drive • Rockville, Maryland 20852  
 301.231.7400 • www.biosci-intl.com • fax: 301.231.7277

## CERTIFICATE OF CALIBRATION

Model:	SAS Super 90
Air Sampler Serial #:	97/D22645
Air Sampler Head Serial #:	8519
Customer:	Aerobiology Laboratory
Customer Asset ID #:	n/a
Calibration performed at:	JBW site 10242 Little Rock Ln Frederick, MD 21702

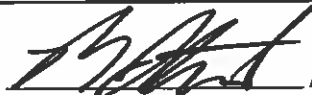
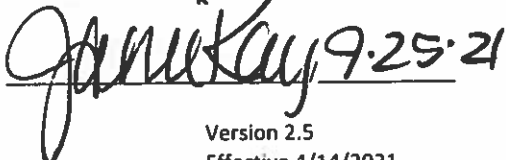
Cal. Date:	25 Sep 2021
Cal. Due:	25 Sep 2022 (12 months)
Procedure:	EOP-030
Certificate #:	97/D22645-2464
Volume sampled (L):	1000
Calibrated w/media type:	BBL TSA Petri
Plate Lot #:	1134140
Plate Exp Date:	10/27/2021

	<i>As Found</i>	<i>In Tolerance</i>	<i>As Left</i>	<i>In Tolerance</i>	<i>Acceptable Range</i>
Battery output (Volts):	9.9	n/a	9.6	n/a	>8.2
Temperature (F°):	66.8	n/a	66.8	n/a	59 - 95
Barometric pressure (in. HG):	30.0	n/a	30.0	n/a	n/a
Time to sample 1000 Liters (min)	11.49	n/a	11.03	n/a	n/a
Temp. & Pressure Standardization Factor:	1.01	n/a	1.01	n/a	n/a
Air velocity reading (ft/min)	48.0	n/a	50.0	n/a	n/a
Air velocity reading (m/sec)	0.244	n/a	0.254	n/a	n/a
Standardized air velocity reading (m/sec)	0.246	n/a	0.256	n/a	n/a
Standardized Air Flow (L/min)	87.0	Yes	90.7	Yes	85.5 - 94.5

Additional heads inspected and determined to be within +/-2%:	n/a
Additional service, preventative maintenance, or calibration notes:	n/a

*Bioscience International certifies that the above described instrument conforms to the original manufacturer's tolerances for the parameters listed (not applicable to As Found data) & has been calibrated in accordance with ISO 17025:2017 guidelines using standards whose accuracies are traceable to the U.S. National Institute of Standards & Technology, have been verified with respect to instrumentation whose accuracy is traceable to NIST, or are derived from accepted values of physical constants. CMC test uncertainty is +/-2.2%. Instruments are calibrated with a test uncertainty ratio of 4:1 or greater whenever possible, with uncertainty defined as within a 95% confidence interval using a coverage factor of k = 2. In all cases, statistical methods are used to minimize uncertainty using the best commercially available methods. In Tolerance conditions are based on test results falling within the Acceptable Range. Measurement uncertainty is provided separately & independent of the decision rule. Voltage readings are for preventative maintenance purposes & not part of the calibration; values other than voltage, temperature, pressure, & air velocity are calculated values. Calibration results relate only to the items listed above; e.g., the instrument should be recalibrated prior to switching to a different media size (e.g., from 90mm Petri dishes to 55mm contact plates or vice versa).*

<u>Measurement Standards</u>				
ID	Description	Last Cal.	Cal. Due	
J-T95452022004	Velocity	12/2/2020	12/2/2021	
J-10510922-200515237	Temperature & Pressure	8/31/2020	8/31/2022	

Work performed by / date:  9.25.21 Reviewed by / date:  9.25.21



# CERTIFICATE OF CALIBRATION

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



<b>CUSTOMER NAME:</b> JBW & ASSOCS INC 10242 LITTLE ROCK LN FREDERICK MD 21702-1822 USA	<b>CERTIFICATE NUMBER</b>	300308817
	<b>DATE OF CALIBRATION</b>	2 DECEMBER, 2020
	<b>PAGE</b>	1 OF 1

<b>ENVIRONMENT CONDITIONS</b>			<b>MODEL</b>	9545
TEMPERATURE	73.00 (22.8)	°F (°C)	<b>SERIAL NUMBER</b>	T95452022004
RELATIVE HUMIDITY	29	%RH		
BAROMETRIC PRESSURE	29.37 (994.6)	inHg (hPa)		

AS LEFT       IN TOLERANCE  
 AS FOUND       OUT OF TOLERANCE

## - CALIBRATION VERIFICATION RESULTS -

<b>TEMPERATURE VERIFICATION</b>				<b>SYSTEM T-101</b>				<b>Unit: °F (°C)</b>			
METHOD USED: 1000006234											
UNCERTAINTY: +/-0.12 DEGREES F (0.06 C)											
#	STANDARD	MEASURED	ALLOWABLE RANGE	#	STANDARD	MEASURED	ALLOWABLE RANGE	#	STANDARD	MEASURED	ALLOWABLE RANGE
1	32.1 (0.0)	32.1 (0.1)	31.5-32.6 (-0.3-0.3)	2	139.8 (59.9)	139.7 (59.8)	139.3-140.4 (59.6-60.2)				

<b>HUMIDITY VERIFICATION</b>				<b>SYSTEM II-102</b>				<b>Unit: %RH</b>			
METHOD USED: 1000006233											
UNCERTAINTY: 0.5% + 1.07 %RH											
#	STANDARD	MEASURED	ALLOWABLE RANGE	#	STANDARD	MEASURED	ALLOWABLE RANGE	#	STANDARD	MEASURED	ALLOWABLE RANGE
1	10.0	11.8	7.0-13.0	4	70.0	70.4	67.0-73.0				
2	30.0	31.3	27.0-33.0	5	90.0	89.5	87.0-93.0				
3	50.1	51.3	47.1-53.1								

<b>VELOCITY VERIFICATION</b>				<b>SYSTEM V-111</b>				<b>Unit: ft/min ( m/s )</b>			
METHOD USED: 1000006237											
UNCERTAINTY: +/-1.3 %											
#	STANDARD	MEASURED	ALLOWABLE RANGE	#	STANDARD	MEASURED	ALLOWABLE RANGE	#	STANDARD	MEASURED	ALLOWABLE RANGE
1	0 (0.00)	0 (0.00)	-3-3 (-0.02-0.02)	7	646 (3.28)	649 (3.30)	627-665 (3.18-3.38)				
2	35 (0.18)	36 (0.18)	32-38 (0.16-0.19)	8	994 (5.05)	993 (5.04)	964-1024 (4.90-5.20)				
3	65 (0.33)	65 (0.33)	62-68 (0.32-0.35)	9	1488 (7.56)	1490 (7.57)	1444-1533 (7.33-7.79)				
4	100 (0.51)	100 (0.51)	97-103 (0.49-0.52)	10	2495 (12.68)	2485 (12.62)	2420-2570 (12.29-13.06)				
5	160 (0.81)	160 (0.81)	155-165 (0.79-0.84)	11	4498 (22.85)	4483 (22.78)	4363-4633 (22.16-23.53)				
6	329 (1.67)	326 (1.66)	319-338 (1.62-1.72)	12	5811 (29.52)	5753 (29.23)	5637-5985 (28.63-30.41)				

TSI Incorporated does hereby certify that the above described instrument conforms to the manufacturer's specifications (not applicable to As Found data) and has been calibrated using standards whose accuracies are traceable to the International System of Units (SI) through the National Institute of Standards and Technology within the limitations of NIST's calibration services or have been derived from accepted values of natural physical constants or have been derived by the ratio type of self-calibration techniques. TSI is registered to ISO 9001:2015. TSI is accredited to ISO 17025:2017 by ANAB Certificate Number AC-2850.

The aforementioned uncertainty values represent expanded uncertainty and are based on a standard uncertainty multiplied by a coverage factor k=2 providing a confidence level of approximately 95%. This report may not be reproduced unless permission is obtained in writing from the TSI calibration service department issuing this report. The unit is found to have passed when the readings are within the specification limits of the device as presented as the allowable range stated with each measurement above. The customer shall assess the results and uncertainty in order to determine if the results meet their needs.

Measurement Variable	System ID	Last Cal.	Cal. Due	Measurement Variable	System ID	Last Cal.	Cal. Due
Temperature	E010657	02-14-20	02-28-21	Temperature	E010658	02-14-20	02-28-21
Temperature	E010655	01-21-20	01-31-21	Humidity	E003539	08-21-20	02-28-21
DC Voltage	E004018	06-17-20	06-30-21	Temperature	E004398	10-26-20	04-30-21
Pressure	E004041	08-18-20	02-28-21	Pressure	E001058	08-18-20	02-28-21
Velocity	E010494	10-11-19	10-31-22				

<b>Performed By</b>	<b>Signature</b>	<b>Approved By</b>	<b>Signature</b>	<b>Date Issued</b>
Ka Vang	<i>Ka Vang</i>	Holly A. Hueby	<i>Holly A. Hueby</i>	12/2/2020

Doc. ID: CERT\_DEFAULT  
END OF REPORT



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



Cert. No.: 6530-11510401

Traceable® Certificate of Calibration for Digital Barometer

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

Instrument Identification:

Model: 10510-922, S/N: 200515237 Manufacturer: Control Company

Standards/Equipment:

Table with 4 columns: Description, Serial Number, Due Date, NIST Traceable Reference. Rows include Digital Barometer, Digital Thermometer, Chilled Mirror Hygrometer, and Climate Chamber.

Certificate Information:

Technician: 57 Procedure: CAL-31 Cal Date: 31 Aug 2020 Cal Due Date: 31 Aug 2022 Test Conditions: 55.92%RH 24.51°C 1007mBar

Calibration Data: (New Instrument)

Table with 11 columns: Unit(s), Nominal, As Found, In Tol, Nominal, As Left, In Tol, Min, Max, ±U, TUR. Rows show calibration data for %RH, °C, and mb/hPa.

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).

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

Marisa Elms, Technical Manager

Note :

Maintaining Accuracy:

In our opinion once calibrated your Digital Barometer should maintain its accuracy. There is no exact way to determine how long calibration will be maintained. Digital Barometer 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.

Issue Date : 31 Aug 2020

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

Control Company is an ISO/IEC 17025:2017 Calibration Laboratory Accredited by (A2LA) American Association for Laboratory Accreditation, Certificate No. 1750.01. Control Company is ISO 9001:2015 Quality Certified by DNV GL, Certificate No. CERT-01805-2008-AQ-HOU-ANAB. International Laboratory Accreditation Cooperation - Multilateral Recognition Arrangement (ILAC-MRA).