

BIOSCIENCE INTERNATIONAL

Innovative Microbiology Products
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CERTIFICATE OF CALIBRATION

| | |
|----------------------------|---|
| Model: | SAS Super 100 |
| Air Sampler Serial #: | 20-D-16385 |
| Air Sampler Head Serial #: | 52060 |
| Customer: | Aerobiology Laboratory |
| Customer Asset ID #: | n/a |
| Calibration performed at: | JBW site 10242 Little Rock Ln Frederick, MD 21702 |

| | |
|--------------------------|-------------------------|
| Cal. Date: | 16 Apr 2022 |
| Cal. Due: | 16 Apr 2023 (12 months) |
| Procedure: | EOP-030 |
| Certificate #: | 20-D-16385-2667 |
| Volume sampled (L): | 1000 |
| Calibrated w/media type: | BBL TSA Petri |
| Plate Lot #: | 1315837 |
| Plate Exp Date: | 6/2/2022 |

| | As Found | In Tolerance | As Left | In Tolerance | Acceptable Range |
|---|----------|--------------|---------|--------------|------------------|
| Battery output (Volts): | 10.0 | n/a | 9.7 | n/a | >8.2 |
| Temperature (F°): | 64.3 | n/a | 64.3 | n/a | 59 - 95 |
| Barometric pressure (in. HG): | 29.90 | n/a | 29.90 | n/a | n/a |
| Time to sample 1000 Liters (min) | 9.66 | n/a | 9.84 | n/a | n/a |
| Temp. & Pressure Standardization Factor: | 1.01 | n/a | 1.01 | n/a | n/a |
| Air velocity reading (ft/min) | 57.0 | n/a | 56.0 | n/a | n/a |
| Air velocity reading (m/sec) | 0.290 | n/a | 0.284 | n/a | n/a |
| Standardized air velocity reading (m/sec) | 0.293 | n/a | 0.287 | n/a | n/a |
| Standardized Air Flow (L/min) | 103.5 | Yes | 101.7 | Yes | 95 - 105 |

| | |
|---|-----|
| 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> | | Last Cal. | Cal. Due |
|------------------------------|------------------------|-----------|-----------|
| ID | Description | | |
| J-T95451921005 | Velocity | 9/1/2021 | 9/1/2022 |
| J-10510922-200515237 | Temperature & Pressure | 8/31/2020 | 8/31/2022 |

Work performed by / date: Bob Bontrah 4-16-22 Reviewed by / date: [Signature] 4-16-22



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



| | | |
|--|---------------------|-------------------|
| CUSTOMER NAME: JBW & ASSOCS INC 10242 LITTLE ROCK LN FREDERICK MD 21702-1822 USA | CERTIFICATE NUMBER | 300367056 |
| | DATE OF CALIBRATION | 1 SEPTEMBER, 2021 |
| | PAGE | 1 OF 1 |

| | | | | |
|------------------------|---------------|------------|---------------|--------------|
| ENVIRONMENT CONDITIONS | | | MODEL | 9545 |
| TEMPERATURE | 73.86 (23.3) | °F (°C) | SERIAL NUMBER | T95451921005 |
| RELATIVE HUMIDITY | 43 | %RH | | |
| BAROMETRIC PRESSURE | 29.08 (984.8) | inHg (hPa) | | |

| | |
|---|--|
| <input checked="" type="checkbox"/> AS LEFT | <input checked="" type="checkbox"/> IN TOLERANCE |
| <input type="checkbox"/> AS FOUND | <input type="checkbox"/> OUT OF TOLERANCE |

- CALIBRATION VERIFICATION RESULTS -

| TEMPERATURE VERIFICATION | | | | SYSTEM T-101 | | | | Unit: °F (°C) | | | |
|---|------------|------------|----------------------|--------------|--------------|--------------|-------------------------|---------------|--|--|--|
| METHOD USED: 10000006234 | | | | | | | | | | | |
| UNCERTAINTY: +/-0.12 DEGREES F (0.06 C) | | | | | | | | | | | |
| # | STANDARD | MEASURED | ALLOWABLE RANGE | # | STANDARD | MEASURED | ALLOWABLE RANGE | | | | |
| 1 | 32.0 (0.0) | 32.2 (0.1) | 31.5-32.6 (-0.3-0.3) | 2 | 139.9 (59.9) | 139.9 (59.9) | 139.3-140.4 (59.6-60.2) | | | | |

| HUMIDITY VERIFICATION | | | | SYSTEM II-102 | | | | Unit: %RH | | | |
|------------------------------|----------|----------|-----------------|---------------|----------|----------|-----------------|-----------|--|--|--|
| METHOD USED: 10000006233 | | | | | | | | | | | |
| UNCERTAINTY: 0.5% + 1.07 %RH | | | | | | | | | | | |
| # | STANDARD | MEASURED | ALLOWABLE RANGE | # | STANDARD | MEASURED | ALLOWABLE RANGE | | | | |
| 1 | 10.0 | 12.4 | 7.0-13.0 | 4 | 70.0 | 70.6 | 67.0-73.0 | | | | |
| 2 | 30.0 | 31.8 | 27.0-33.0 | 5 | 90.0 | 89.5 | 87.0-93.0 | | | | |
| 3 | 50.0 | 51.4 | 47.0-53.0 | | | | | | | | |

| VELOCITY VERIFICATION | | | | SYSTEM V-111 | | | | Unit: ft/min (m/s) | | | |
|--------------------------|------------|------------|---------------------|--------------|--------------|--------------|-------------------------|--------------------|--|--|--|
| METHOD USED: 10000006237 | | | | | | | | | | | |
| UNCERTAINTY: +/-1.3 % | | | | | | | | | | | |
| # | STANDARD | MEASURED | ALLOWABLE RANGE | # | STANDARD | MEASURED | ALLOWABLE RANGE | | | | |
| 1 | 0 (0.00) | 0 (0.00) | -3-3 (-0.02-0.02) | 7 | 644 (3.27) | 644 (3.27) | 624-663 (3.17-3.37) | | | | |
| 2 | 35 (0.18) | 36 (0.18) | 32-38 (0.16-0.19) | 8 | 997 (5.06) | 993 (5.05) | 967-1027 (4.91-5.23) | | | | |
| 3 | 65 (0.33) | 65 (0.33) | 62-68 (0.32-0.35) | 9 | 1474 (7.49) | 1482 (7.53) | 1430-1519 (7.26-7.71) | | | | |
| 4 | 101 (0.51) | 100 (0.51) | 98-104 (0.50-0.53) | 10 | 2489 (12.64) | 2480 (12.60) | 2414-2563 (12.26-13.02) | | | | |
| 5 | 161 (0.82) | 160 (0.81) | 156-165 (0.79-0.84) | 11 | 4491 (22.81) | 4420 (22.45) | 4356-4625 (22.13-23.50) | | | | |
| 6 | 330 (1.67) | 328 (1.67) | 320-339 (1.62-1.72) | 12 | 5812 (29.52) | 5731 (29.11) | 5638-5986 (28.64-30.41) | | | | |

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-2830.

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 | 02-02-21 | 02-28-22 | Temperature | E010658 | 02-02-21 | 02-28-22 |
| Temperature | E010655 | 02-02-21 | 02-28-22 | Humidity | E001539 | 08-26-21 | 02-28-22 |
| DC Voltage | E004018 | 06-08-21 | 06-30-22 | Temperature | E004398 | 04-20-21 | 10-31-21 |
| Pressure | E004041 | 08-18-21 | 02-28-22 | Pressure | E001058 | 08-18-21 | 02-28-22 |
| Velocity | E010494 | 10-11-19 | 10-31-22 | | | | |

| | | | | |
|--------------|-------------|----------------|----------------|-------------|
| Performed By | Signature | Approved By | Signature | Date Issued |
| Chimova Vse | Chimova Vse | Hilly A. Fryby | Hilly A. Fryby | 9/2/2021 |

Doc ID: CERT_DEFAULT
END OF REPORT