AGILE MEDICAL PACKAGING AND DEVICES

CLEANROOM AND GOWN ROOM CERTIFICATION REPORT

AT REST TESTING

REPORT NO. 24359

NOVEMBER 8, 2024

The Quality Choice in Clean Room Certification

CERTIFICATION & CALIBRATION SERVICES, INC.
Phone (214) 607-0555 ◆ www.cleanroomcerts.com

NEBB CR156

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CLEANROOM AND GOWN ROOM
OVERALL CLEANROOM CERTIFICATION SUMMARY

TEST DATE: NOVEMBER 8, 2024

1. IN-PLACE FILTER LEAK SCAN

Design Requirements - No leaks as defined per ISO 14644-3:2005 B.6.2.7

AREA	# OF FILTERS	# OF LEAKS	# OF FILTERS REPLACED	# OF FILTERS REPAIRED
Gown Room	1	0	0	0
Cleanroom	4	0	0	0

2. AIRFLOW VELOCITY MEASUREMENTS

Design Requirements - Results are as reported

AREA	AVERAGE FPM	AIR CHANGES PER HOUR
Gown Room	164	118
Cleanroom	152	109

3. ROOM PRESSURIZATION MEASUREMENTS

Design Requirements - Cleanroom is positive pressure to areas with less clean requirements.

1. Pressure differentials are as reported.

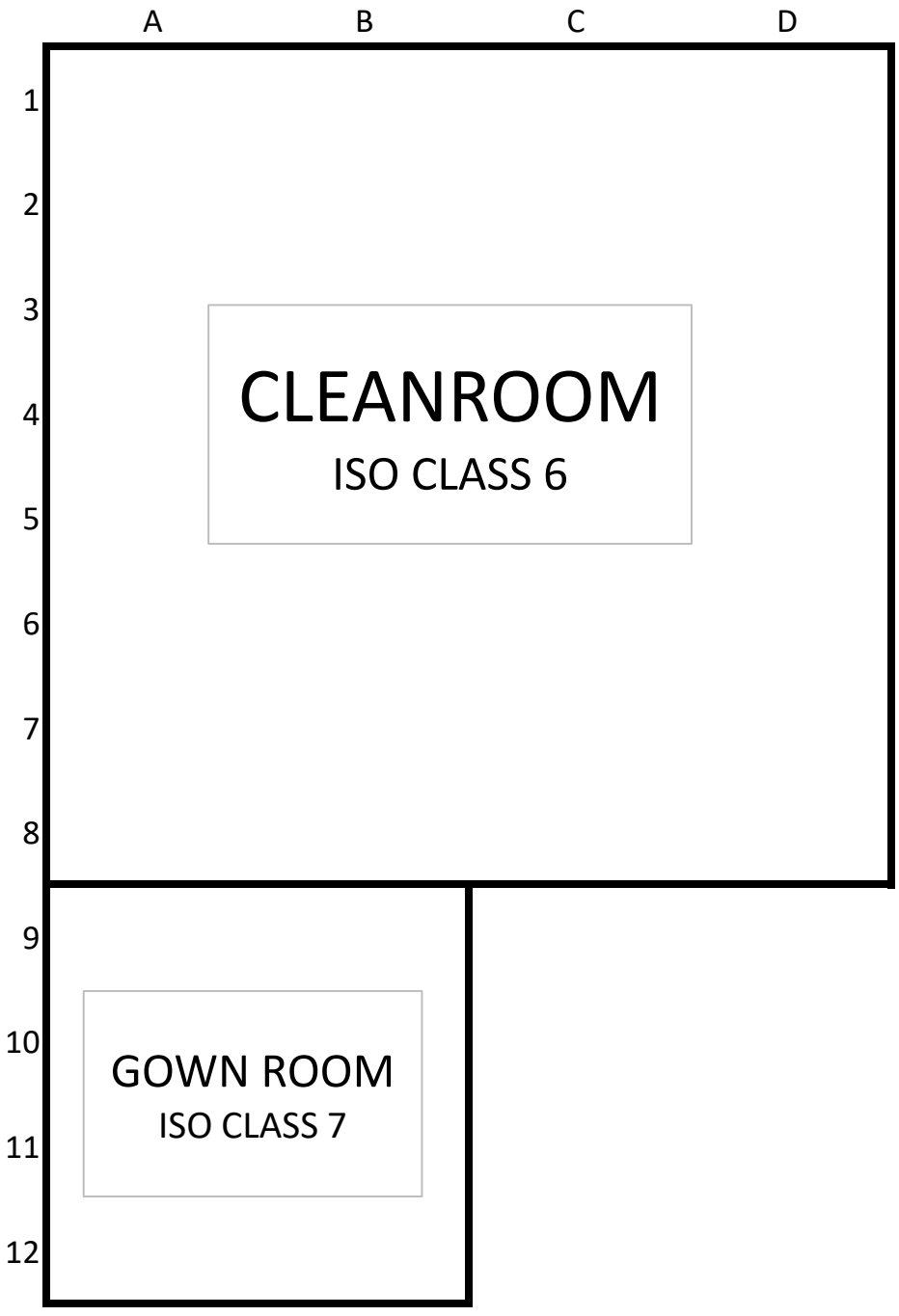
4. AIRBORNE PARTICLE COUNTS

All rooms passed the designated room classifications. Results are as follows:

AREA	ISO CLASS	PARTICLE SIZE	AVERAGE PARTICLE/M3	PASS/ FAIL
Gown Room	7	0.5	1,126	Pass
Cleanroom	6	0.5	131	Pass

AGILE MEDICAL PACKAGING AND DEVICES

ROOM LAYOUT



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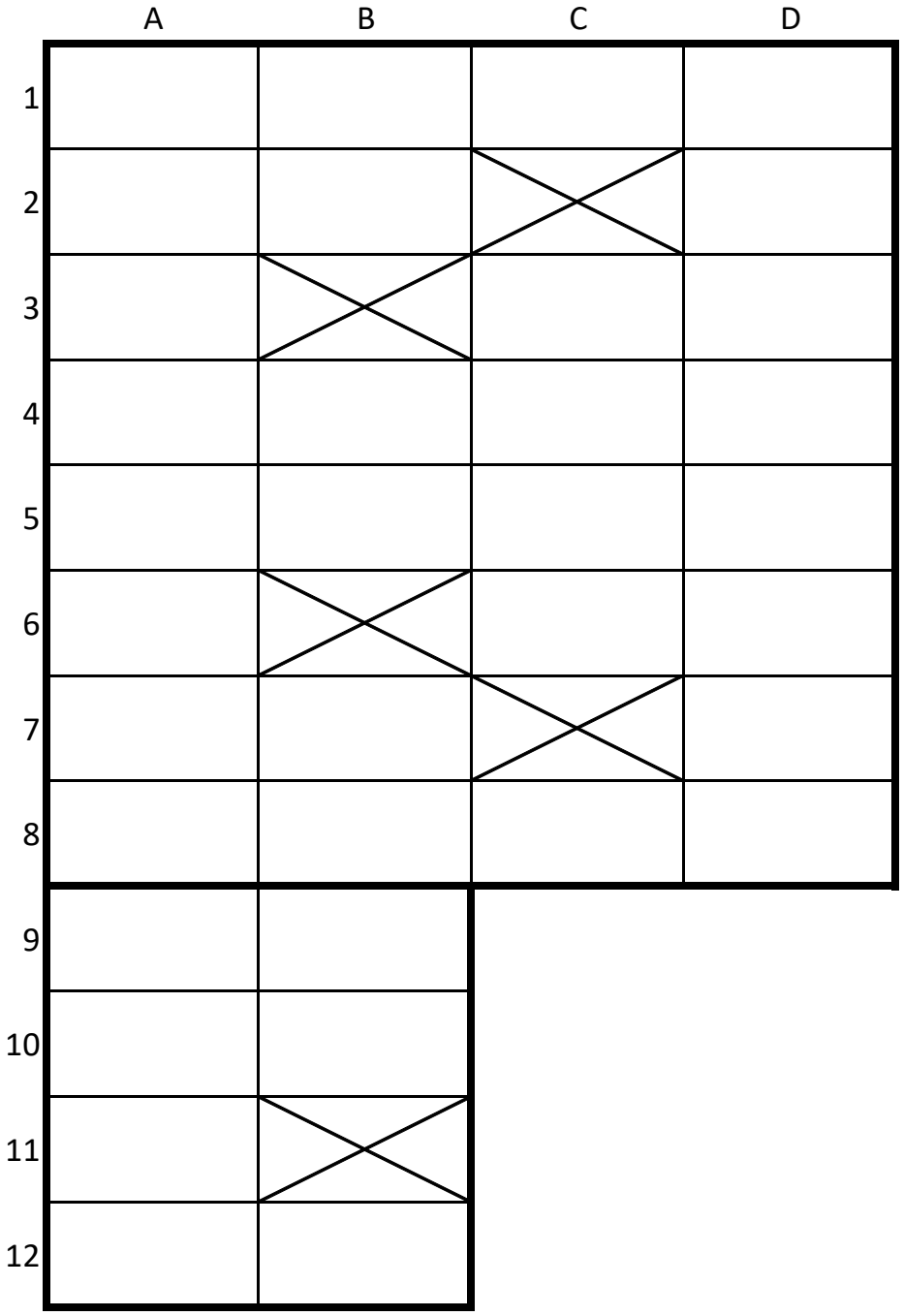
FILTER LAYOUT



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Test Date: 11/8/2024
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CLEANROOM AND GOWN ROOM
CLEANROOM CERTIFICATION SUMMARY

TEST DATE: NOVEMBER 8, 2024

IN-PLACE FILTER LEAK TEST

DESIGN REQUIREMENTS:

1. No Leaks as defined by ISO 14644-3: 2005
   Annex B.6.2 Installed Filter System Leakage Test

INSTRUMENTATION:

1. Climet Instruments CI-170 particle counter with 1 CFM sampling rate and minimum sensitivity of 0.3 microns.

PROCEDURE:

Using an aerosol photometer with a 1 CFM sample rate, scan all filters, blank pans and grids at a scan rate of 10 feet per minute in slightly overlapping strokes. The probe is held approximately 1" from the area to be tested. Record each leak on a map and re-scan replaced filters to ensure no leak exists.

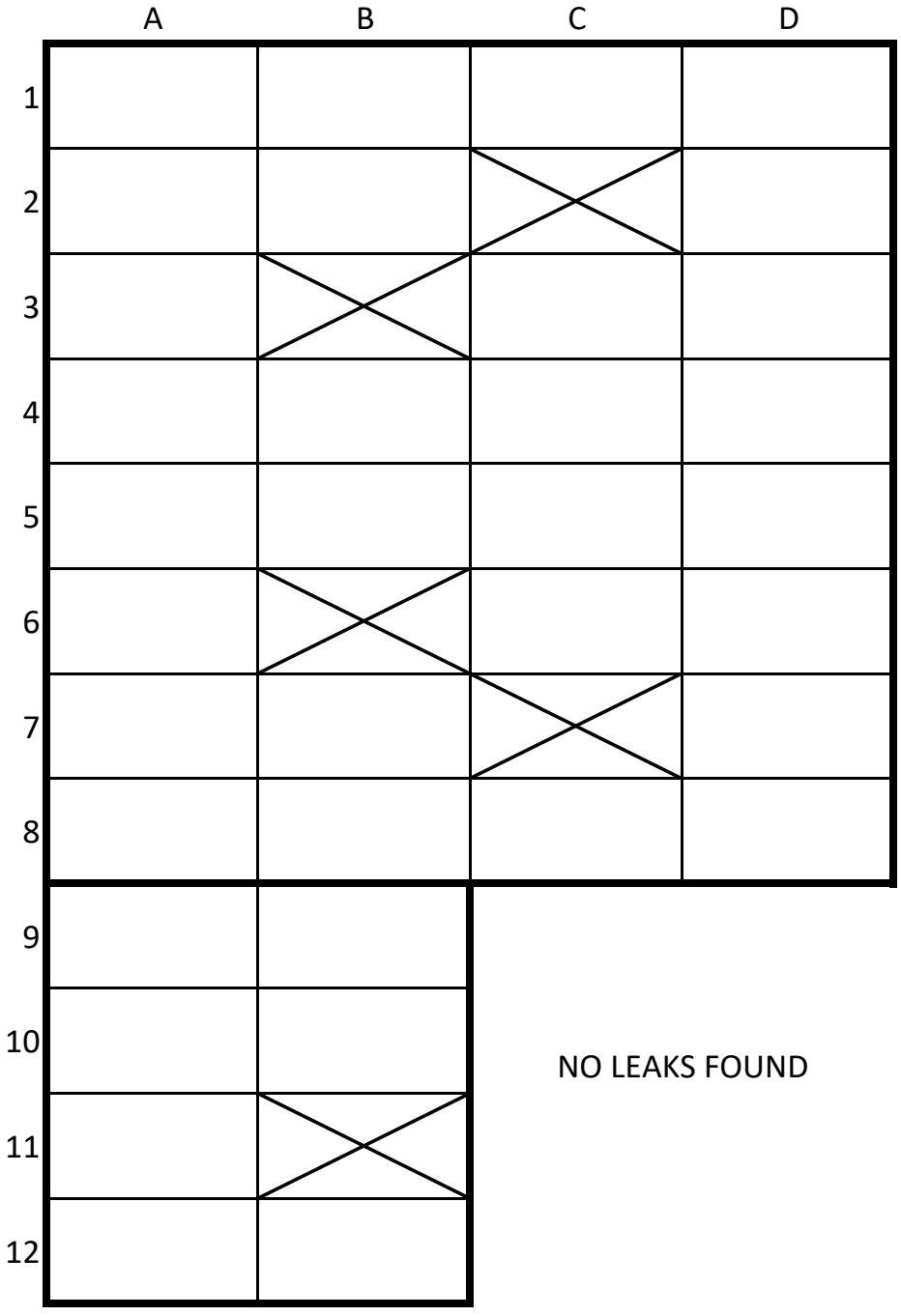
LEAK SCAN RESULTS

1. The results are as follows:

AREA	# OF FILTERS	# OF LEAKS	# OF FILTERS REPLACED	# OF FILTERS REPAIRED
Gown Room	1	0	0	0
Cleanroom	4	0	0	0

AGILE MEDICAL PACKAGING AND DEVICES

FILTER LEAK SCAN



NO LEAKS FOUND

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CEILING SCAN DATA

#	ROOM	LOC.	FILTER SIZE			DATE	TEST RESULT	ACTION TAKEN
1	Gown Room	B11	24	x	48	11/08/2024	O	N/A
2	Cleanroom	B3	24	x	48	11/08/2024	O	N/A
3	Cleanroom	B6	24	x	48	11/08/2024	O	N/A
4	Cleanroom	C2	24	x	48	11/08/2024	O	N/A
5	Cleanroom	C7	24	x	48	11/08/2024	O	N/A

NOTES:
O - NO LEAKS FOUND
X - LEAK AT FILTER

AGILE MEDICAL PACKAGING AND DEVICES
CLEANROOM AND GOWN ROOM
CLEANROOM CERTIFICATION SUMMARY

TEST DATE: NOVEMBER 8, 2024

AIRFLOW VELOCITY MEASUREMENTS

REFERENCES:
1. ISO 14644-3:2005(E) Metrology and Test Methods
   Annex B.4.2.4 Supply Air Velocity by Measurement of face velocity

DESIGN REQUIREMENTS:
1. Results are as tested

INSTRUMENTATION:
1. Shortridge Multimeter model ADM-860C with velgrid attachment.

PROCEDURE:
Measurements of 8 second duration were taken on a 2' X 2' test matrix under each filter at an elevation 3-6" beneath each filter face as per procedures in IES-RP-CC-006.3. Two measurements were recorded for each 2' X 4' filter within the cleanrooms.

RESULTS
1. The results are as follows:

AREA	AVERAGE FPM	STANDARD DEVIATION	RELATIVE STD. DEV.
Gown Room	164	NA	NA
Cleanroom	152	5.3	3.5%

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FILTER VELOCITIES - FEET PER MINUTE

	A	B	C	D
1				
2			146	
3		157		
4				
5				
6		150		
7			157	
8				
9				
10				
11		164		
12				

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AIRFLOW MEASUREMENT DATA

AREA	LOC.	1	2	AVG FPM	HEPA AREA	CFM	DATE
Gown Room	B11	167	160	164	6.1	997	11/08/2024
AVERAGE				**164**		**997**	
STANDARD DEVIATION				**NA**		**NA**	
RELATIVE STANDARD DEVIATION				**NA**		**NA**	
Total room supply air volume (cu. ft./min)						**997**	
Total room supply air volume (cu. ft./hr)						**59,841**	
Total room volume (cu. ft.)						**506**	
Total air changes per hour (ACPH)						**118**	

AREA	LOC.	1	2	AVG FPM	HEPA AREA	CFM	DATE
Cleanroom	B3	162	152	157	6.1	958	11/08/2024
Cleanroom	B6	152	148	150	6.1	915	11/08/2024
Cleanroom	C2	146	146	146	6.1	891	11/08/2024
Cleanroom	C7	147	166	157	6.1	955	11/08/2024
AVERAGE				**152**		**929**	
STANDARD DEVIATION				**5.3**		**32.4**	
RELATIVE STANDARD DEVIATION				**3.5%**		**3.5%**	
Total room supply air volume (cu. ft./min)						**3,718**	
Total room supply air volume (cu. ft./hr)						**223,077**	
Total room volume (cu. ft.)						**2,048**	
Total air changes per hour (ACPH)						**109**	

TEST DATE: NOVEMBER 8, 2024

ROOM PRESSURIZATION MEASUREMENTS

REFERENCES:

1. ISO 14644-3:2005(E) Metrology and Test Methods
   Annex B.5 Air Pressure Difference Test

DESIGN REQUIREMENTS:

1. Cleanroom maintains a positive pressure to areas with less clean requirements.

INSTRUMENTATION:

1. Shortridge Multimeter model ADM-860C

PROCEDURE:

Close all doors throughout the cleanroom. Measure and record the pressure differential (in. w.g.) between the inner most cleanroom or clean space and adjacent spaces, rooms, or the exterior environment. Measure and record the pressure differential (in. w.g.) between the next adjacent spaces or rooms and other spaces or the exterior environment. Continue the above measurements until all pressure differentials have been obtained and recorded.

RESULTS

1. The results are indicated on the enclosed map and data sheet.

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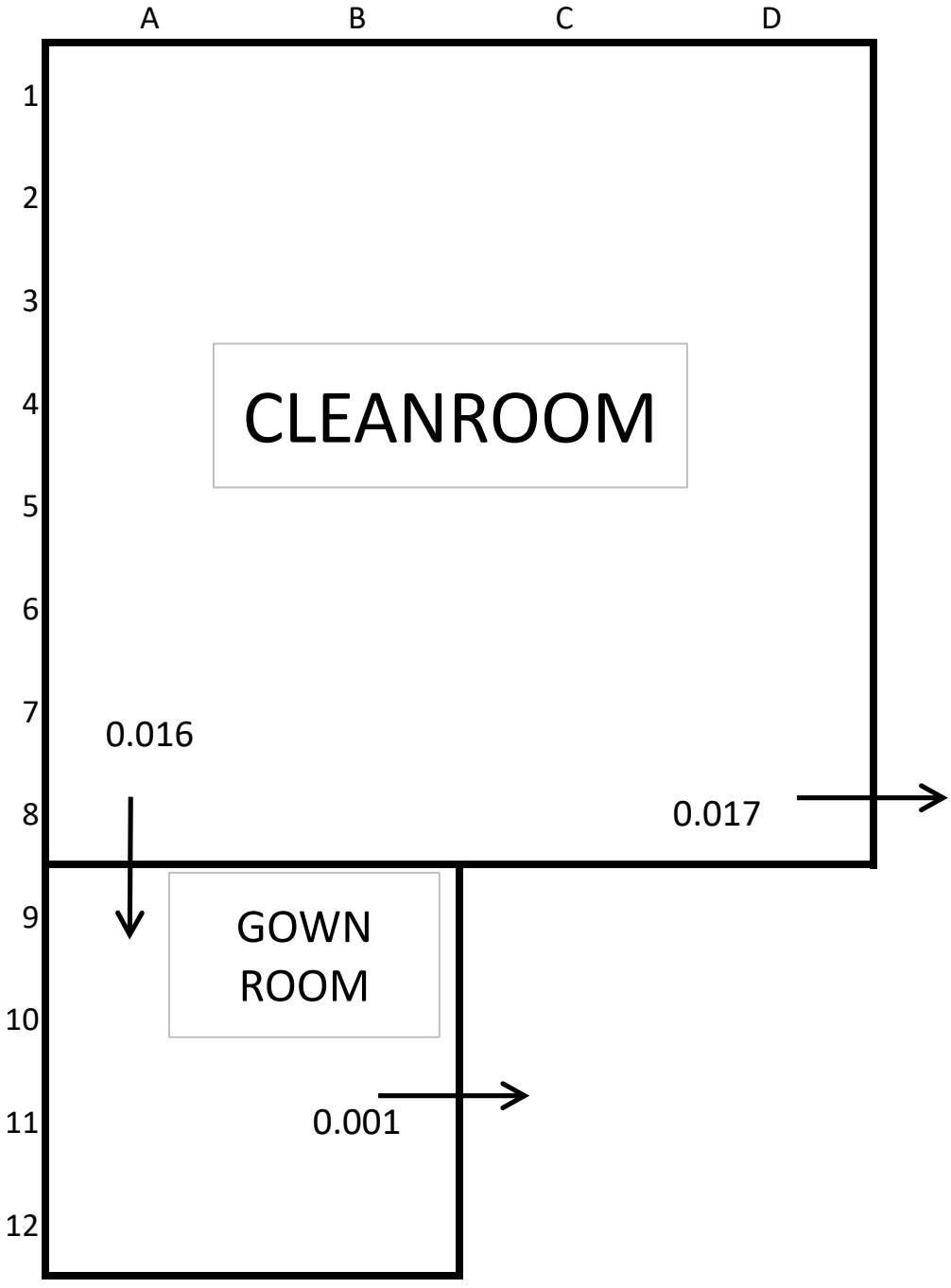
ROOM PRESSURIZATION - INCHES WATER GAUGE



AGILE MEDICAL PACKAGING AND DEVICES
ROOM PRESSURIZATION DATA

LOCATION	PRESSURE	AREA	DATE
A8	0.016 " w.g.	*Cleanroom to Gown Room	11/08/2024
B11	0.001 " w.g.	*Gown Room to Non Controlled Workspace	11/08/2024
D8	0.017 " w.g.	*Cleanroom to Non Controlled Workspace	11/08/2024

* ROOM UNDER POSITIVE PRESSURE

AGILE MEDICAL PACKAGING AND DEVICES
CLEANROOM AND GOWN ROOM
CLEANROOM CERTIFICATION SUMMARY

TEST DATE: NOVEMBER 8, 2024

AIRBORNE PARTICLE COUNTS

REFERENCES:
1. ISO 14644-1:2015 Classification of Air Cleanliness

DESIGN REQUIREMENTS:
1. ISO Class 6 ≤ 35,200 particles/cu. m. at 0.5 microns
2. ISO Class 7 ≤ 352,000 particles/cu. m. at 0.5 microns

INSTRUMENTATION:
1. Climet Instruments CI-750 particle counter with 75 LPM sampling rate and minimum sensitivity of 0.3 microns

PROCEDURE:
Particle counts were taken as specified in ISO 14644-1:2015 with sample volumes of 1 cubic foot in the ISO Class 6 area. An isokinetic probe was used on the particle counters and size discriminations of 0.3, 0.5, 1.0, and 5.0 microns were recorded.

RESULTS
1. Testing was performed under At Rest Conditions. The results for the Cleanroom is as follows:

AREA	ISO CLASS	PARTICLE SIZE	AVERAGE PARTICLE/M3	TOTAL LOC	PASS/ FAIL
Gown Room	7	0.5	1,126	3	Pass
Cleanroom	6	0.5	131	7	Pass

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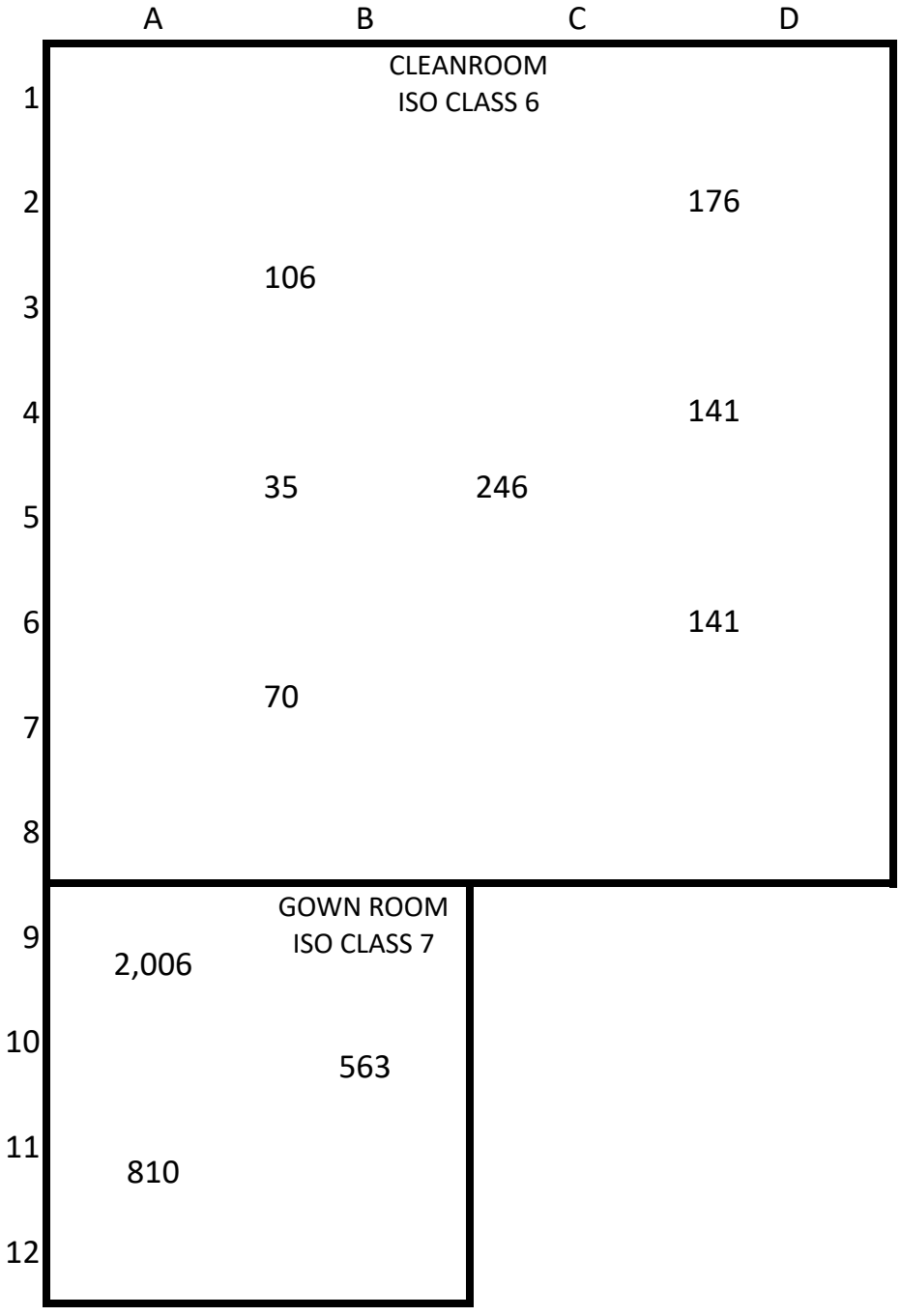
PARTICLE COUNTS @ 0.5 MICRONS PER CUBIC METER



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PARTICLE COUNT DATA

COUNTS PER CUBIC METER

AREA	LOC.	≤ 0.3 μM	**≤ 0.5 μM**	≤ 1.0 μM	≤ 5.0 μM	DATE
Gown Room	A9	3,485	**2,006**	1,232	0	11/08/2024
Gown Room	A11	1,725	**810**	422	35	11/08/2024
Gown Room	B10	1,056	**563**	317	0	11/08/2024
Standard Deviation>>		1,024	**630**	409	17	
Standard Error>>		591	**364**	236	10	
Averages>>		2,089	**1,126**	657	12	
ISO Class 7 Limits>>		--	**352,000**	83,200	2,930	

This area has "PASSED" ISO 14644-1:2015 for ISO Class 7 @ 0.5 microns in the At Rest Condition

AREA	LOC.	≤ 0.3 μM	**≤ 0.5 μM**	≤ 1.0 μM	≤ 5.0 μM	DATE
Cleanroom	B3	282	**106**	35	0	11/08/2024
Cleanroom	B5	106	**35**	35	0	11/08/2024
Cleanroom	B7	106	**70**	35	0	11/08/2024
Cleanroom	C5	493	**246**	106	0	11/08/2024
Cleanroom	D2	528	**176**	106	0	11/08/2024
Cleanroom	D4	387	**141**	106	0	11/08/2024
Cleanroom	D6	422	**141**	70	35	11/08/2024
Standard Deviation>>		161	**64**	33	12	
Standard Error>>		61	**24**	12	5	
Averages>>		332	**131**	70	5	
ISO Class 6 Limits>>		102,000	**35,200**	8,320	293	

This area has "PASSED" ISO 14644-1:2015 for ISO Class 6 @ 0.5 microns in the At Rest Condition

TESTING PROCEDURES

Testing may be performed at different stages as characterized by the completeness of cleanroom installation and operational modes as defined below. The testing stages are defined as follows:

Stage 1 **As-Built Facility**: A clean room which is complete and operating with all services connected and functioning, following initial clean down. There is to be no process equipment or operating personnel within the facility.

Stage 2 **At-Rest Facility**: A cleanroom which is complete and operating. The room is to be fully populated with process equipment staged in a non-operational mode. There shall be no operating personnel present.

Stage 3 **Operating Facility**: A cleanroom in normal operation, fully populated with functioning process equipment and operating personnel.

NOTE: At times it will be necessary to take exception to strict compliance with the aforementioned testing stages. Deviation or interaction among the stages may be required due to availability or operational status of the process equipment. These situations shall be identified and acknowledged as part of the contractual agreement.

REFERENCE DOCUMENTS

1. NATIONAL ENVIRONMENTAL BALANCING BUREAU (NEBB): Procedural Standards for Certified Testing of Cleanrooms - 2009.
2. RECOMMENDED PRACTICE IEST-RP-CC-001.6: HEPA & ULPA Filters - 2017
3. RECOMMENDED PRACTICE IEST-RP-CC-002.4: Unidirectional-Flow Clean Air Devices - 2009
4. RECOMMENDED PRACTICE IEST-RP-CC006.3: Testing Clean Rooms - 2004.
5. RECOMMENDED PRACTICE IEST-RP-CC-013.3: Calibration Procedures and Guidelines for Select Equipment Used in Testing Cleanrooms and Other Controlled Environments - 2012
6. RECOMMENDED PRACTICE IEST-RP-CC-034.2:1999: HEPA and ULPA Filter Media
7. ISO 14644-1:2015 Cleanrooms and controlled environments – Part 1: Classification of air cleanliness by particle concentration.
8. ISO 14644-2:2015 Monitoring to provide evidence of cleanroom performance related to air cleanliness by particle concentration
9. ISO 14644-3:2019 Cleanrooms and associated controlled environments - Part 3: Metrology and test methods
10. ISO 14644-4: 2001 Determination of particle size distribution — Single particle light interaction methods — Part 4: Light scattering airborne particle counter for clean spaces
11. EU GMP Guidance Annex 1: Manufacturing of Sterile Medicinal Products

I. FILTER TEST PROCEDURES - GENERATED AEROSOL PARTICLE CHALLENGE METHOD

A. SCOPE

1. The purpose of the HEPA filter installation Integrity test is to insure and confirm that the HEPA filter system is properly installed by verifying the absence of bypass leakage in the installation, and that the HEPA filters are free of defects and pin hole leaks. Portions of the test methods given have been adapted from IEST-RP-CC034.2:1999: HEPA and ULPA Filter Media. It is particularly important for laminar airflow and mixed airflow cleanrooms where an ISO Class 5 (Class 100) or cleaner specification is imposed.

2. The test is made by introducing an aerosol challenge upstream of the HEPA filters and scanning immediately downstream of the filters and support frame. This procedure detects small pinholes or other damage in the filter medium and frame seal, bypass leaks in the filter frame and gasket seal, and leaks in the filter bank framework.

B. TESTING APPARATUS

1. Use an optical particle counter with the capability to detect the quantity of particles per volume of air at 0.5 micron and greater and 5.0 micron and greater when used to certify a cleanroom to ISO Class 6 through ISO Class 9 (Class 1000 through Class 100,000); 0.2 micron, 0.3 micron and/or 0.5 micron or greater for ISO Class 5(Class 100); and 0.1, 0.2, 0.3, and/or 0.5 micron or greater for ISO Class 1 through ISO Class 4(Class 1 and Class 10) as per ISO 14644-1:2015.

2. Use a handheld isokinetic sampling probe of either square or rectangular configuration. Round probes are specifically prohibited for this test.

3. Optional: A handheld probe with an audible alarm which sounds for single particles will allow one operator to conduct this test.

4. Use an aerosol particle generator

C. PROCEDURES

1. Verify that the design airflow velocity for the primary air systems has been set by the NEBB TAB Firm.

2. Measure and record the ambient particle concentration, (upstream of the HEPA filter installation to be tested) prior to generation of any particle challenge. Record the quantity of particles equal to and greater than several particle sizes, beginning with the size of concern in the proposed scan test to be conducted. For example, if the proposed test is intended to challenge the filter system with "X" quantity of particles @ 0.2 μm and greater per cubic foot of air, record the measured number at 0.2 μm and greater, 0.3 μm and greater. 0.5 μm and greater, and 1.0 μm and greater.

3. Generate the aerosol particle challenge in a manner that will produce the best uniform mixture possible. Introducing the challenge before fans or other devices that will produce mixing of the air is preferred.

4. Measure the upstream particle concentration as the challenge generation is increased. Challenge generation should begin at lower quantities and gradually be increased while watching the resulting count registered by the particle counter to avoid apparent overloading. Generate the maximum (or specified) quantity without overloading the particle counter to the degree it stops counting increased challenge.

5. Note: In some cases it will be necessary (if the target quantity is in excess of the quantity the particle counter will report), to use a suitable dilution device to obtain an accurate count of the upstream particle concentration. Once the specified particle quantity challenge is attained, this becomes the Upstream Challenge Concentration at the size of concern and greater, and is to be applied to the scan rate Equation in Subsection 5.

6. The resulting Upstream Challenge Concentration, along with other information specified below is used to calculate the Acceptable Scan Rate to be used in the Generated Aerosol Particle Challenge test.

   Equation: $$S_r = \frac{C_c \times L_s \times F_s \times D_p}{60 \times N_p}$$

   Where: S_r = Acceptable Scan Rate - in./s (cm/s)
   C_c = Upstream challenge concentration - particles/ft^3 (particles/L)
   L_s = Significant leak - percentage of upstream concentration (typically 0.01% or .0001 multiplier)
   F_s = Sample flow rate of instrument used - cfm (L/min)
   D_p = Probe dimension parallel to scan direction - inches (cm)
   60 = conversion - 60 sec/min
   N_p = Number of particle counts that indicate the leak

7. Using the resulting scan rate as established in Subsection 5, the filter face and the perimeter of the filter pack should be scanned by passing the probe in slightly overlapping strokes so that the entire area of the filter and its holding apparatus is sampled. The probe should be held approximately 1 inch (25 mm) from the area to be tested during scanning. Separate passes should be made around the entire periphery of the filter, along the bond between the filter pack and the frame, and around the seal between the filter and the device, at a traverse rate of not more than that determined by the above equation.

8. When scan testing a filter system, a particle count detection exceeding "N_p" will indicate the need for backtracking to determine if the count(s) repeat or are continuous. If a continuous count is detected, a sustained probe count period at the leak location is required to determine if the leak is in excess of the significant leak value (L_s) specified in 6.4.2.5. When using 0.26 μm particles as the challenge aerosol, at least a 0.5 cubic foot sample is recommended, unless prior to that volume, it becomes obvious that the significant leak value will be exceeded.

D. REPORTING

1. Report all leaks. Report them either as less than (<) 0.01% of the upstream concentration (C_c or greater than (>) 0.01% of the upstream concentration (C_c). By appropriate symbols or wording in the printed report, indicate the resulting disposition of the leak after repairs, if repairs are part of the cleanroom certificate work scope.

E. ACCEPTANCE

1. An unacceptable leak may be defined as any location with counts greater than 0.01 percent of the upstream concentration. However, most end users consider any location on the filter face with repetitive particle counts as undesirable, and the filter or installation should be considered for repair or replacement.

F. REPAIRS

1. Repairs to filter installation leaks may be made by procedures acceptable to both Buyer and Seller or Specifier. HEPA filters may be recommended for repairs if:

    a. The size of the repair(s) is less than 3 percent of each filter face area, and
    b. One dimension of any repair is limited to 1.5 inches (38 mm) maximum, or as otherwise agreed upon by the Specifier.

II. FILTER AIRFLOW AND UNIFORMITY TESTS

A. SCOPE

1. The purpose of these tests is to determine the average airflow velocity and/or volume, the uniformity of airflow within a unidirectional area of a cleanroom, and the total airflow provided.

2. Measurement readings shall be taken at a specified distance (entrance plane) from the face of the filter system, such as 3 to 6 inches (75 to 150 mm) from the filter face, or as specified by the Buyer or Owner.

3. The measurement area shall be a cross-sectional area of the filter face normal to the airflow. This area shall consist of the filter media area, which is exclusive of the filter frame or patch area of the filter (the net free area). For example, a 48 inch x 24 inch (1200 mm x 600 mm) HEPA filter does not have a net free area of eight square feet (0.72 square meters), but is closer to a little over seven square feet (0.63 square meters), with the frame, etc. deducted.

B. MEASUREMENT INSTRUMENTATION

1. Use an airflow velocity measurement device capable of accurate velocity measurement between 50 fpm and 120 fpm (0.25 m/s and 0.80 m/s) velocity ± 5 percent of the reading.

C. VELOCITY TEST PROCEDURES (Unidirectional Airflow)

1. Divide the net filter face (entrance plane) for single point measurements into grids of equal area of not greater than one square foot (0.09 square meters), or as specified by the buyer or Owner. With other types of measurements, such as a tube array sensor, individual grid areas shall not exceed four square feet (0.37 square meters).

2. Measure and record the velocity at the specified distance of each grid point. Special care is necessary to keep the sampled area unobstructed during the airflow measurement. The use of a support stand is recommended with sensor type measuring instruments.

3. Take the measurement for a minimum of 5 seconds or the minimum specified time for the meter, using the average during that period as the measurement. No adjacent reading should vary by more than 20 percent of one another.

D. AIRFLOW VOLUME TEST PROCEDURES

1. Flow measuring hoods are preferred for taking airflow volume measurements from each HEPA filter or supply air diffuser. Airflow volumes may be calculated using the following Equation with accurate corrected velocity measurements: $Q = A \times V$

Where:
- Q = Airflow - cfm (L/s)
- A = Filter Face area
- V = Velocity - fpm (m/s)

2. Seat the flow measuring hood firmly to prevent air leakage.

3. Measure and record the airflow volumes in cubic feet per minute (liters per second).

E. NON-UNIDIRECTIONAL AIRFLOW TESTS

1. Airflow velocity measurements shall be made at each HEPA filter or supply air diffuser.

2. To use a sensing device for velocity measurements, divide the net filter face (entrance plane) for single point measurements into grids of equal area of not greater than one square foot (0.09 square meters), or as specified by the buyer or Owner. With other types of measurements, such as a tube array sensor, individual grid areas shall not exceed four square feet (0.37 square meters).

3. Measure and record the velocity at the specified distance of each grid point. Special care is necessary to keep the sampled area unobstructed during the airflow measurement. The use of a support stand is recommended with sensor type measuring instruments.

F. AIRFLOW AND UNIFORMITY REPORTING

1. Velocity Reports

a. Record all airflow measurements with corresponding grid locations.

b. Calculate the average airflow velocity, which is the arithmetic mean of the recorded velocity measurement readings, using the following Equation:

Equation: $V_{AM} = (V_1 + V_2 + ... + V_N) /N$

Where: V_{AM} = Arithmetic Mean Velocity - fpm (m/s)
V_N = Velocity readings - fpm (m/s)
N = Number of readings

c. Calculate the standard deviation of the velocity measurement readings using the following Equation:

$$SD_V = (((V_1 - V_{AM})^2 + (V_2 - V_{AM})^2 + ... + (V_N - V_{AM})^2)/ N-1)^{1/2}$$

Where: SD_V = Standard Deviation of velocities - fpm (m/s)
V_N = Velocity readings - fpm (m/s)
N = Number of readings

d. The relative standard deviation (uniformity) of the airflow velocity may be calculated as a percentage using the following Equation:

$$RSD = SD_V/V_{AM} \times 100$$

Where: RSD = Relative Standard Deviation - %
SD_V = Standard Deviation of velocities - fpm (m/s)
V_{AM} = Velocity average - fpm (m/s)

2. Airflow Volume Reports

a. If HEPA filters or diffusers are different in size, corrections must be applied to normalize the airflow volume.

b. Averaging airflow volumes is not appropriate if HEPA filters or diffusers have different specified velocities or normalized airflow volumes.

c. Calculate the average airflow volume reading .which is the arithmetic mean of the recorded airflow volume measurements.

d. Calculate the standard deviation of the airflow measurement readings.

e. The relative standard deviation (uniformity) of the airflow volume may be calculated as a percentage.

G. TEST ACCEPTANCE

1. The average airflow velocity for the cleanroom should be within ± 5 percent of that specified by the Buyer or Owner unless otherwise specified.

2. The average or total airflow volume for the clean room should be within ± 5 percent of that specified by the Buyer or Owner unless otherwise specified.

3. The relative standard deviation should not exceed 15 percent unless otherwise specified by the Buyer or Owner.

4. Identify all readings which are outside the airflow uniformity ranges.

III. PRESSURIZATION TEST

A. SCOPE

1. After a cleanroom or clean space has been tested successfully for airflow volume, velocity, uniformity and parallelism, the proper pressurization of cleanroom areas must be verified. The purpose of this test is to verify the capability of the HVAC systems to maintain the specified pressure differentials.

B. INSTRUMENTATION

1. An electronic manometer, inclined manometer or differential pressure gauge should be used with all openings and doors closed and all air handling systems operating.

C. PROCEDURE

1. Measure and record the pressure differentials (in.w.g. or Pa) between the inner most cleanroom or clean space and adjacent spaces, rooms, or the exterior environment.

2. Measure and record the pressure differential (in.w.g. or Pa) between the next adjacent spaces or rooms and other spaces or the exterior environment.

3. Continue the above measurements until all pressure differentials have been obtained and recorded.

D. REPORTING

1. Report all measured pressure differentials to the nearest 0.01 in.w.g. (2.5 Pa) at recorded or specified locations.

E. ACCEPTANCE

1. Specified pressurization levels (such as 0.03 to 0.05 in.w.g. or 7.5 to 12.5 Pa) are subject to the agreement between the Buyer and the Seller.

IV. AIRBORNE PARTICLE COUNT

A. SCOPE

1. The airborne particle count test is performed to determine the actual particle count level within the facility at the time of the test (as-built, at-rest, or operating).

B. TEST APPARATUS

1. Use an optical particle counter having a particle size discrimination capability to count particles 0.5 micron and larger for testing clean areas designated ISO Class 6(Class 1000) and greater, a capability to count particles 0.2 micron and greater for testing clean areas designated ISO Class 5(Class 100), and a capability to count particles 0.1 micron and greater for testing clean areas designated from ISO Class 1 through 4(Class 1 through Class 10).

C. TEST PROCEDURES

1. Verify that all aspects of the cleanroom system which contribute to its operational integrity (air handling, filtration systems, walls, ceilings, floors, etc.) are complete and functioning nominally in accordance with the requirement of the type clean room and the operational mode under test. The requirements are those specified by the Cleanroom Owner.

2. Establish a test point grid pattern at the working level which satisfies user requirements and is compatible with the type of cleanroom and the operational mode being tested.

3. Sampling Points - ISO 14644-1:2015

   a. Derive the minimum number of sampling points, N_L, from Table A.1 of ISO 14644-1 (2015).

   b. Divide the whole cleanroom or clean zone into N_L sections of equal area.

   c. select within each section a sampling location considered to be representative of the characteristics of the section.

   d. at each location, position the particle counter probe in the plane of work activity or another specified point.

   e. When the area of the cleanroom or clean zone is greater than 1000 m2, apply the following equation:

   $N_L = 27 \times (A/1000)$

   Where: N_L = Minimum number of sample locations
   A = Area of the cleanroom in square meters

4. The size of particles for room certification particle counts shall be as agreed between the Owner and Certification Firm or as specified. Particle counts and size normally shall be based on Table 1 of ISO 14644-1 Cleanrooms and associated controlled environments.

a. For example, particle counts for a ISO Class 5(Class 100) cleanroom may be based on 0.2 micron, 0.3 micron, and/or 0.5 micron particle sizes per unit volume of air depending on the agreement or specification.

Note: All measurements are made under ambient conditions; there is no induced challenge.

5. Each sample of air tested at each location shall be of sufficient volume such that at least 20 particles would be detected, if the particle concentration were at the class limit, for each specified particle size. The following formulas provide a means of calculating the minimum volume of air to be sampled as a function of the number of particles per unit volume listed in the appropriate table:

   ISO 14644-1:2015 (Table 1):

   Volume = 20/[class limit (particle/volume) from Table 1] x 1000 {Volume is in litres}

6. The volume of air sampled shall be no less than 2 litres (.071 ft^3) for ISO 14644-1:2015. The results of the calculation of the sampled volume shall not be rounded down.

D. REPORTING

1. Record the mean particle count at each grid location.

2. Note all measurement exceeding the specified air cleanliness level.

E. ACCEPTANCE

1. To classify the complete cleanroom as meeting the specified air cleanliness level, particle counts shown on the sample point plan should not exceed the specified level. Clean work zone areas within the cleanroom may also be specified and classified by the maximum allowable particle count, in addition the room or work area may be classified differently in the as-built, at-rest. and operating facility modes. Classification requirements should be specified.

Test:	**In Place Filter Leak Scan**
Equipment:	Particle Counter
Model:	CI-170
Serial Number:	217780
Calibration Due:	04/30/2025

Test:	**Airflow Velocity Measurements/Room Pressurization**
Equipment:	Anemometer
Manufacturer:	Shortridge Instruments
Model:	ADM-860C
Serial Number:	M24283
Calibration Date:	08/20/2025

Test:	**Airborne Particle Counts**
Equipment:	Particle Counter
Model:	CI-750t
Serial Number:	057182
Calibration Due:	04/30/2025

Calibration Services Inc.
615 Aldrich Street Uxbridge, MA 01569 508-278-2932, C-508-523-8684
E-mike@calibrationservicesinc.com,

CERTIFICATE OF CALIBRATION
Performance Summary

Climet aerosol particle counter, model: CI-170 S/N: 217780 **Unit ID**: 7780

Cal date: 27 Apr 2024 **Due date:** 30 Apr 2025

PREPARED FOR: CCS, NORTH SMITHFIELD, RI

CALIBRATION PRCEDURE NO; 92045102

Physical condition upon receipt: ___ not applicable
x good ___ damaged ___ poorly packaged ___ rough handling

Condition of calibration, as found: condition, as left
__ new unit x in tolerance __ out of tolerance x to specifications

Comments: None.

Calibration parameters: Laser Power and Peak Noise are recorded for reference purposes only. Air Flow is a critical parameter during calibration, because it establishes the nominal sample volume and it establishes particle velocity, which affects sizing. Because flow variances after calibration affects sample volume inversely, variances up to 10% have negligible effect on recorded counts. Particle response amplitudes correspond to detection thresholds. Amplitudes greater than thresholds will result in counts greater than normal. Amplitudes below thresholds will result in undercounting.

Calibration performed by: Mike DiLibero

Signed: Signed: _____ Date: 27 Apr 2024

Calibration Services Inc.
615 Aldrich Street Uxbridge, MA 01569 508-278-2932, C-508-523-8684
E-mike@calibrationservicesinc.com,

CALIBRATION TEST DATA

MODEL: CI-170 Aerosol Particle Counter S/N 217780 ID:7780

DATE OF CALIBRATION: 27 Apr 2024 Due: 30 Apr 2025

Condition of instrument upon receipt __X_ In tolerance ____ Out of tolerance

ELECTRONIC MEASUREMENTS

TEST	NOMINAL	TOLERANCE	AS FOUND	PASS	AS LEFT
L.D. current drive (voltage)	55 mVdc	(reference)	53 mVdc	N/A	53mVdc
AIR FLOW	28.3 LPM	+/- 1.5 LPM	28.3 LPM	Y	28.3 LPM
PEAK NOISE	<200 mV	(reference)	64 mV	N/A	64 mV

^Initial value; the voltage increases as the laser diode ages

PERFORMANCE DATA

NOMINAL PARTICLE SIZE	0.3 UM	0.5 UM	1.0 UM	3.0 UM	5.0 UM
EXPECTED AMPLITUDE (last cal)	234 mV	210 mV	714 mV	222 mV	199 mV
TOLERANCE	+/- 40 mV	+/- 35 mV	+/-100 mV	+/- 35 mV	+/- 40 mV
AS FOUND	222 mV	228 mV	738 mV	223 mV	205 mV
PASS (Y/N)	Y	Y	Y	**Y**	Y
AS LEFT	222 mV	228 mV	738 mV	223 mV	205 mV

COLLECTIVE UNCERTAINTY OF MEASUREMENT: +/- 2.3% AT 0.3 UM AND 0.5 UM; +/- 3.5% AT 5 UM.
The collective uncertainty is based on the contribution of the Pulse Height Analyzer, the Mass Flow Meter, and the judgment of the technician in establishing the median of the displayed distribution, as determined by empirical tests and 1 sigma uncertainty calculation.

ACCURACY RATIO: The collective uncertainty of the measurement standard is less than 25% of the listed tolerances (4:1 measurement ratio).

CALIBRATION TOLERANCES: The particle sizes listed are nominal; refer to the Test Equipment Record for actual sizes. Tolerance voltages listed represent a 2% sizing error and the particle deviation from the size. If the particle response is below the tolerance for *Expected Amplitude* the particle will be sized larger than it actually is, resulting in counts that are greater than they actually should be. The actual counts cannot be extrapolated from the out-of-tolerance counts. Temperature and Humidity sensors, if present, are for reference, and are not part of the calibration.

Technician: Mike DiLibero

Calibration Services Inc.
615 Aldrich St., Uxbridge, MA 01569 508-278-2932, Cell 508-523-8684
Email; mike@calibrationservicesinc.com,

CERTIFICATE OF CALIBRATION
Standards of Traceability

UNIT ID: 7780

DOCUMENT DATE: 27 Apr 2024

STATEMENT OF TRACEABILITY

This instrument has been calibrated in accordance with ISO 10012-1 and ISO 17025

Temperature and Relative Humidity are not controlled during calibration because of the wide operating range of the instrument. (Temperature:30 deg F to 120 deg F Humidity:0-100%, non-condensing).

All test equipment used in the calibration of Calibration Services Inc.'s' products is calibrated at manufacturer Recommended intervals by an approved outside calibration service. Calibration certificates for each piece of test equipment is on file at Calibration Services Inc: copies will be supplied if requested.

Calibration traceability to a National Measurement Standard (NMS) is established by using monodisperse latex spheres as a calibration standard. These spheres are sized by methods traceable, by lot number, to the National Institute of Standards and Technology.

The instruments and reference standards listed below were used to calibrate the instrument certified by this document.

CALIBRATION METHOD

Climet particle counters are calibrated by using one or more sizes of polystyrene latex spheres, which serve as standards for comparing and adjusting amplifier response to known particle sizes. The particles are introduced to the sensor as an aerosol sample with moderate concentration. The digital voltmeter is used to make reference measurements. The oscilloscope is used for reference during calibration, and as a tool to evaluate the condition of the sensor. The Pulse Height Analyzer (PHA) is the primary calibration instrument. It is used to collect particle pulses produced by the test particles; these form a distribution of pulses on the PHA display.

The PHA provides the requisite resolution to determine the mediation of the distribution. The amplifier circuitry is adjusted, as needed, to bring the median distribution to the amplitude specified for a given particle standard. Initial factory prime calibration includes verification of count efficiency by count comparison with CDC/DMA or with a reference particle counter used as a transfer standard.

Equipment	Make and Model	Serial Number		Cal Date	Cal Due Date
Pulse Height	**Amptek MCA 8000**	**000839**		**04 Aug 2023**	**31 Aug 2024**
Analyzer	**Amptek MCA 8000**	**000671**		**08 Aug 2023**	**31 Aug 2024**
DVM	**Fluke 117C**	**55690400WS**		**28 Aug 2023**	**31 Aug 2024**
Oscilloscope	**TDS220**	**BO71196**		**28 Aug 2023**	**31 Aug 2024**
Rotronic	**Hygrometer S1**	**44949**		**28 Aug 2023**	**31 Aug 2024**
Flow Meter	**4040**	**40401024010**		**05 Aug 2023**	**31 Aug 2024**
Flow Meter	**4040**	**40401829008**		**22 Aug 2023**	**31 Aug 2024**
Particle Counter	**CI-88R**	**104148**		**31 Aug 2023**	**31 Aug 2024**
Particle Counter	**CI-88R**	**103962**		**23 Oct 2023**	**31 Oct 2024**
Digital Stopwatch	**1051**	**111599574**		**28 Aug 2023**	**31 Aug 2024**

PARTICLE STANDARDS

NOMINAL SIZE	ACTUAL SIZE	SIZE DEVIATION	LOT NUMBER	EXP. DATE		NOMINAL SIZE	ACTUAL SIZE	SIZE DEVIATION	LOT NUMBER	EXP. DATE
300 nm	303 nm	+/- 6 nm	244496	**9/2024**		1.0 um	1.025 um	+/-0.018um	260019	**10/2025**
500 nm	508 nm	+/- 8 nm	250693	**2/2025**		3.0 um	2.998 um	+/- 0.032um	264186	**2/2026**
800 nm	803 nm	+/- 14 nm	259413	**9/2025**		10.0 um	10.13 um	+/-0.06 um	259536	**9/2025**
5.0 um	5.049 um	+/- 0.38 um	240527	**5/2024**		25 um	25.09 um	+/-0.26 um	262205	**12/2025**

Calibration Services Inc.
615 Aldrich Street Uxbridge, MA 01569 508-278-2932, C-508-523-8684
E-mike@calibrationservicesinc.com,

CERTIFICATE OF CALIBRATION
COUNT EFFICIENCY

MODEL: CI-170 Aerosol Particle Counter S/N: 217780 ID:7780 has been checked for 50%

And 100% count efficiency by comparison with the CI-88R reference counter

NOMINAL	ACTUAL SIZE	SIZE DEVIATION	EFFECIENCY @ SIZE	AS FOUND	PASS
0.3 um	303 nm	+/-6 nm	ISO-21051 Spec 30-70%	41%	Y
0.5 um	508 nm +/- 8nm	+/-8 nm	ISO 210501 Spec 30-70%	47%	Y
0.5 um	508 nm +/-8nm	+/-8 nm	ISO 210501 Spec 90-110%	100%	Y

INSTRUMENT	MODEL	SERIAL NUMBER	CAL DATE	DUE DATE
COMARITOR	CLIMET I-88R	103962	23 Oct 2023	31 Oct 2024

Resolution test

ISO SPEC: EQUAL TO OR LESS THAN 15% Results: 4 Pass: X

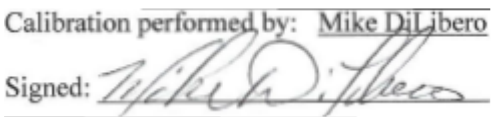
False Count Rate Testing

Allowable counts per CM at 95% Upper Confidence Limit, by flow rate:
Results Based On One Ten-Minute Sample
28.3 LPM: 9.2 counts

TEST CHANNEL	COUNTS IN 10 MINUTES	95% UCL COUNTS PER CUBIC METER	PASS	% OF CLASS 5 LIMIT
0.3 um	0	10.6	Y	0.10%
0.5 um	0	10.6	Y	0.30%

UNCERTAINTY O F MEASUREMENT: +/- 2.1% for 50% count efficiency: +/- 1.9% for 100% count efficiency: +/-0.6% for resolution. The collective uncertainty for count efficiency and resolution are represented in percentage points, to be added – not a percentage of the measurement. The uncertainty represents a 95% confidence interval where k=2.

Calibration performed by: Mike DiLibero

Signed: 

Date: 27 Apr 2024

AIRDATA MULTIMETER CERTIFICATE OF CALIBRATION

Customer ID: 008724 S/N: M24283

Customer: CERTIFICATION & CALIBRATION SERVICES, INC. City: ROWLETT State: TX

Model #: ADM-560C PO #: _____ Calibration Due Date: 08/20/2025 Order #: 240741

Rh 52 % Ambient Temperature 73 °F Barometric Pressure 28.43 in Hg

ABSOLUTE PRESSURE TEST (in Hg)
TEST METER TOLERANCE = ± 2.0 % ± .1 in Hg

Pressure Standard: Heise #02-R S/N: 41741/42451 _____
Pressure Standard: Heise #04-R S/N: 41743/42453 _____
Pressure Standard: Heise #06-R S/N: 41742/42452-1 _____
Pressure Standard: Heise #08-R S/N: 42186/43328 _____
Pressure Standard: Heise #10-R S/N: 42203/43352 _____

Pressure Standard: Heise #12A-R S/N: 45605/48491 _____
Pressure Standard: Heise #14-R S/N: 43412/45043-3 _____
Pressure Standard: Heise #16-R S/N: 43413/45044 _____
Pressure Standard: Heise #18-R S/N: 44581/46845-2 _____
Pressure Standard: Heise #20-R S/N: 44582/46847 ✓

Approx Set Point	Standard	Test Meter	% Diff
14.0	14.00	13.9	-.71
28.4	28.43	28.4	-.11
40.0	40.00	40.0	.00

DIFFERENTIAL PRESSURE TEST (in wc)
TEST METER TOLERANCE = ± 2.0 % ± 0.001 in wc

Pressure Standard: Heise #01-L S/N: 41739/42449 _____
Pressure Standard: Heise #01-R S/N: 41739/42446 _____
Pressure Standard: Heise #02-L S/N: 41741/42454 _____
Pressure Standard: Heise #03A-L S/N: 45570/48461 _____
Pressure Standard: Heise #03A-R S/N: 45570/48460 _____
Pressure Standard: Heise #04-L S/N: 41743/42456 _____
Pressure Standard: Heise #05-L S/N: 41740/42450 _____
Pressure Standard: Heise #05-R S/N: 41740/42447 _____
Pressure Standard: Heise #06-L S/N: 41742/42455 _____
Pressure Standard: Heise #07-L S/N: 42185/42186 _____
Pressure Standard: Heise #07-R S/N: 42185/43326 _____
Pressure Standard: Heise #08-L S/N: 42186/43329 _____
Pressure Standard: Heise #09-L S/N: 42202/43351 _____
Pressure Standard: Heise #09-R S/N: 42202/43350 _____
Pressure Standard: Heise #10-L S/N: 42203/43353 _____

Pressure Standard: Heise #11-L S/N: 43165/44551-1 _____
Pressure Standard: Heise #11-R S/N: 43165/44730 _____
Pressure Standard: Heise #12A-L S/N: 45605/48490-1 _____
Pressure Standard: Heise #13-L S/N: 43415/45041 _____
Pressure Standard: Heise #13-R S/N: 43415/45039 _____
Pressure Standard: Heise #14-L S/N: 43412/45045 _____
Pressure Standard: Heise #15-L S/N: 43416/45042 _____
Pressure Standard: Heise #15-R S/N: 43416/45040-1 _____
Pressure Standard: Heise #16-L S/N: 43413/45046 _____
Pressure Standard: Heise #17-L S/N: 44579/46842 _____
Pressure Standard: Heise #17-R S/N: 44579/46841 _____
Pressure Standard: Heise #18-L S/N: 44581/46846 _____
Pressure Standard: Heise #19-L S/N: 44580/46844 ✓
Pressure Standard: Heise #19-R S/N: 44580/46843 ✓
Pressure Standard: Heise #20-L S/N: 44582/46848 ✓

Approx Set Point	Standard	Test Meter	% Diff
.0500	.0500	.0502	.40
.1250	.1254	.1254	.00
.2250	.2254	.2255	.04
1.000	1.011	1.010	-.10
2.000	2.011	2.002	-.45
3.600	3.606	3.591	-.42
4.400	4.416	4.416	.00
27.00	27.08	27.00	-.30
50.00	50.12	49.81	-.62
Over Pressure	NA	✓	NA

Shortridge Instruments, Inc.
7855 East Redfield Road Scottsdale, Arizona 85260
(480) 991-6744 • Fax (480) 443-1267 • www.shortridge.com

AIRDATA MULTIMETER CERTIFICATE OF CALIBRATION

S/N: M24283

Order #: 240741

LOW VELOCITY CONFIRMATION (FPM)
TEST METER TOLERANCE = ± 3.0% ± 7 FPM

Vel Eqv Trans Std: S/N: M02009	____	Vel Eqv Trans Std: S/N: M10897	____
Vel Eqv Trans Std: S/N: M02903	____	Vel Eqv Trans Std: S/N: M10901	____
Vel Eqv Trans Std: S/N: M10839	____	Vel Eqv Trans Std: S/N: M13492	✓
Vel Eqv Trans Std: S/N: M10840	____	Vel Eqv Trans Std: S/N: M19325	____

Approx Set Point	Standard	Test Meter	Diff
100	112	112	0
500	511	511	0

ADM-880C, ADM-870C and ADM-860C AirData Multimeters are read in AirFoil Mode. ADM-850L AirData Multimeters are read in Pitot Tube Mode.

TEMPERATURE TEST - AIRDATA MULTIMETER (° F)
TEST METER TOLERANCE = ± 0.2° F

RTD Simulator: S/N 249	Set Point: 35.6° F	95° F	154.4° F
RTD Simulator: S/N 250	Set Point: 35.6° F	95° F	154.4° F
RTD Simulator: S/N 253	Set Point: 35.6° F	95° F	154.4° F
RTD Simulator: S/N 254	Set Point: 35.6° F	95° F	154.4° F
RTD Simulator: S/N 256	Set Point: 35.6° F	95° F	154.4° F
RTD Simulator: S/N 257	Set Point: 35.6° F	95° F	154.4° F
RTD Simulator: S/N 292	Set Point: 35.6° F	95° F	154.4° F
RTD Simulator: S/N 293	Set Point: 35.6° F	95° F	154.4° F
RTD Simulator: S/N 294	Set Point: 35.6° F	95° F	154.4° F
RTD Simulator: S/N 313	Set Point: (35.6° F)	95° F	154.4° F
RTD Simulator: S/N 314	Set Point: 35.6° F	(95° F)	154.4° F
RTD Simulator: S/N 315	Set Point: 35.6° F	95° F	(154.4° F)
RTD Simulator: S/N 316	Set Point: 35.6° F	95° F	154.4° F
RTD Simulator: S/N 317	Set Point: 35.6° F	95° F	154.4° F
RTD Simulator: S/N 318	Set Point: 35.6° F	95° F	154.4° F

	RTD Simulator Temperature	
Equivalent Set Point	Test Meter	Diff
35.60	35.7	.1
95.00	95.0	.0
154.40	154.4	.0

NOTES: _____

Procedure used: Procedure for Differential Pressure, Absolute Pressure and Temperature Calibration of AirData Multimeters SIP-CP01 Revision: 17 Dated: 12/10/15. There were no additions to or deviations from the calibration procedure during this calibration process.

This instrument has been calibrated using Calibration Standards which are traceable to NIST (National Institute of Standards and Technology). Test accuracy ratio is 4:1 for pressures and temperature. Quality Assurance Program and calibration procedures meet the requirements for ANSI/NCSL Z540-1, ISO 17025, MIL-STD 45662A and manufacturer's specifications. Calibration accuracy is certified when meters are used with properly functioning accessories only. All Uncertainties are expressed in expanded terms (twice the calculated uncertainty). This report shall not be reproduced, except in full, without the written approval of Shortridge Instruments, Inc. Results relate only to the item calibrated.

Limitations on use: See Shortridge Instruments, Inc. Instruction Manual for the use of AirData Multimeters

Any calibration due date shown is specified by the customer. The enclosed ADM Calibration Standards for Pressure and Temperature form is an integral part of this calibration and must remain with this Certificate of Calibration.

Calibration Technician(s): B. Jm Calibration Date: 08/20/2024

Calibration Approved by: D. Babb Title: Cal. Supv Date: 08/22/2024

Shortridge Instruments, Inc.
7855 East Redfield Road Scottsdale, Arizona 85260
(480) 991-6744 • Fax (480) 443-1267 • www.shortridge.com

Shortridge Instruments, Inc. AirData Multimeter Calibration Equipment

Order Number: 240741 Serial Number: M241283 Test Type: (Initial) As-Received Final

ABSOLUTE PRESSURE STANDARDS

ADM #02-R	S/N: 41741/42451	Heise Model: PPM-2	Mfgd by Dresser Industries	Calibrated by Ashcroft	Calibration Date: 08/16/23	Due Date: 08/2024
ADM #04-R	S/N: 41743/42453	Heise Model: PPM-2	Mfgd by Dresser Industries	Calibrated by Ashcroft	Calibration Date: 05/28/24	Due Date: 05/2025
ADM #06-R	S/N: 41742/42452-1	Heise Model: PPM-2	Mfgd by Dresser Industries	Calibrated by Ashcroft	Calibration Date: 11/28/23	Due Date: 11/2024
ADM #08-R	S/N: 42186/43328	Heise Model: PPM-2	Mfgd by Dresser Industries	Calibrated by Ashcroft	Calibration Date: 07/14/23	Due Date: 10/2024
ADM #10-R	S/N: 42203/43352	Heise Model: PPM-2	Mfgd by Dresser Industries	Calibrated by Ashcroft	Calibration Date: 05/25/23	Due Date: 08/2024
ADM #12A-R	S/N: 45605/48491	Heise Model: PPM-2	Mfgd by Dresser Industries	Calibrated by Ashcroft	Calibration Date: 11/02/23	Due Date: 11/2024
ADM #14-R	S/N: 43412/45043-3	Heise Model: PPM-2	Mfgd by Dresser Industries	Calibrated by Ashcroft	Calibration Date: 06/07/24	Due Date: 06/2025
ADM #16-R	S/N: 43413/45044	Heise Model: PPM-2	Mfgd by Dresser Industries	Calibrated by Ashcroft	Calibration Date: 06/24/24	Due Date: 06/2025
ADM #18-R	S/N: 44581/46845-2	Heise Model: PPM-2	Mfgd & Calibrated by Ashcroft, Inc.		Calibration Date: 04/09/24	Due Date: 04/2025
ADM #20-R	S/N: 44582/46847	Heise Model: PPM-2	Mfgd & Calibrated by Ashcroft, Inc.		Calibration Date: 09/14/23	Due Date: 09/2024

#02-R, 04-R, 06-R, 08-R, 10-R, 12A-R, 14-R, 16-R	Rated Accuracy: 0.05% fs (0.0305 in Hg)	Range: 0-30 psia	Resolution: 0.01	Uncertainty: < 0.0358
#18-R, 20-R	Rated Accuracy: 0.05% fs (0.0305 in Hg)	Range: 0-60 in Hg	Resolution: 0.001	Uncertainty: < 0.0358

DIFFERENTIAL PRESSURE STANDARDS

ADM #01-L	S/N: 41739/42449	Heise Model: PPM-1	Mfgd by Dresser Industries	Calibrated by Ashcroft	Calibration Date: 08/17/23	Due Date: 08/2024
ADM #01-R	S/N: 41739/42446	Heise Model: PPM-1	Mfgd by Dresser Industries	Calibrated by Ashcroft	Calibration Date: 08/17/23	Due Date: 08/2024
ADM #02-L	S/N: 41741/42454	Heise Model: PPM-1	Mfgd by Dresser Industries	Calibrated by Ashcroft	Calibration Date: 08/16/23	Due Date: 08/2024
ADM #03A-L	S/N: 45570/48461	Heise Model: PPM-1	Mfgd by Dresser Industries	Calibrated by Ashcroft	Calibration Date: 05/24/24	Due Date: 05/2025
ADM #03A-R	S/N: 45570/48460	Heise Model: PPM-1	Mfgd by Dresser Industries	Calibrated by Ashcroft	Calibration Date: 05/16/24	Due Date: 05/2025
ADM #04-L	S/N: 41743/42456	Heise Model: PPM-1	Mfgd by Dresser Industries	Calibrated by Ashcroft	Calibration Date: 05/10/24	Due Date: 05/2025
ADM #05-L	S/N: 41740/42450	Heise Model: PPM-1	Mfgd by Dresser Industries	Calibrated by Ashcroft	Calibration Date: 12/01/23	Due Date: 11/2024
ADM #05-R	S/N: 41740/42447	Heise Model: PPM-1	Mfgd by Dresser Industries	Calibrated by Ashcroft	Calibration Date: 12/01/23	Due Date: 11/2024
ADM #06-L	S/N: 41742/42455	Heise Model: PPM-1	Mfgd by Dresser Industries	Calibrated by Ashcroft	Calibration Date: 12/01/23	Due Date: 11/2024
ADM #07-L	S/N: 42185/42186	Heise Model: PPM-1	Mfgd by Dresser Industries	Calibrated by Ashcroft	Calibration Date: 07/14/23	Due Date: 10/2024
ADM #07-R	S/N: 42185/43326	Heise Model: PPM-1	Mfgd by Dresser Industries	Calibrated by Ashcroft	Calibration Date: 07/14/23	Due Date: 10/2024
ADM #08-L	S/N: 42186/43329	Heise Model: PPM-1	Mfgd by Dresser Industries	Calibrated by Ashcroft	Calibration Date: 07/14/23	Due Date: 10/2024
ADM #09-L	S/N: 42202/43351	Heise Model: PPM-1	Mfgd by Dresser Industries	Calibrated by Ashcroft	Calibration Date: 05/30/23	Due Date: 08/2024
ADM #09-R	S/N: 42202/43350	Heise Model: PPM-1	Mfgd by Dresser Industries	Calibrated by Ashcroft	Calibration Date: 05/30/23	Due Date: 08/2024
ADM #10-L	S/N: 42203/43353	Heise Model: PPM-1	Mfgd by Dresser Industries	Calibrated by Ashcroft	Calibration Date: 05/26/23	Due Date: 08/2024
ADM #11-L	S/N: 43165/44551-1	Heise Model: PPM-1	Mfgd by Dresser Industries	Calibrated by Ashcroft	Calibration Date: 11/07/23	Due Date: 11/2024
ADM #11-R	S/N: 43165/44730	Heise Model: PPM-1	Mfgd by Dresser Industries	Calibrated by Ashcroft	Calibration Date: 11/07/23	Due Date: 11/2024
ADM #12A-L	S/N: 45605/48490-1	Heise Model: PPM-1	Mfgd by Dresser Industries	Calibrated by Ashcroft	Calibration Date: 11/03/23	Due Date: 11/2024
ADM #13-L	S/N: 43415/45041	Heise Model: PPM-1	Mfgd by Dresser Industries	Calibrated by Ashcroft	Calibration Date: 06/21/24	Due Date: 06/2025
ADM #13-R	S/N: 43415/45039	Heise Model: PPM-1	Mfgd by Dresser Industries	Calibrated by Ashcroft	Calibration Date: 06/21/24	Due Date: 06/2025
ADM #14-L	S/N: 43412/45045	Heise Model: PPM-1	Mfgd by Dresser Industries	Calibrated by Ashcroft	Calibration Date: 06/20/24	Due Date: 06/2025
ADM #15-L	S/N: 43416/45042	Heise Model: PPM-1	Mfgd by Dresser Industries	Calibrated by Ashcroft	Calibration Date: 06/26/24	Due Date: 06/2025
ADM #15-R	S/N: 43416/45040-1	Heise Model: PPM-1	Mfgd by Dresser Industries	Calibrated by Ashcroft	Calibration Date: 06/26/24	Due Date: 06/2025
ADM #16-L	S/N: 43413/45046	Heise Model: PPM-1	Mfgd by Dresser Industries	Calibrated by Ashcroft	Calibration Date: 06/26/24	Due Date: 06/2025
ADM #17-L	S/N: 44579/46842	Heise Model: PPM-1	Mfgd & Calibrated by Ashcroft, Inc.		Calibration Date: 04/04/24	Due Date: 04/2025
ADM #17-R	S/N: 44579/46841	Heise Model: PPM-1	Mfgd & Calibrated by Ashcroft, Inc.		Calibration Date: 04/04/24	Due Date: 04/2025
ADM #18-L	S/N: 44581/46846	Heise Model: PPM-1	Mfgd & Calibrated by Ashcroft, Inc.		Calibration Date: 04/04/24	Due Date: 04/2025
ADM #19-L	S/N: 44580/46844	Heise Model: PPM-1	Mfgd & Calibrated by Ashcroft, Inc.		Calibration Date: 10/04/23	Due Date: 09/2024
ADM #19-R	S/N: 44580/46843	Heise Model: PPM-1	Mfgd & Calibrated by Ashcroft, Inc.		Calibration Date: 10/04/23	Due Date: 09/2024
ADM #20-L	S/N: 44582/46848	Heise Model: PPM-1	Mfgd & Calibrated by Ashcroft, Inc.		Calibration Date: 10/04/23	Due Date: 09/2024

#01-L, 03A-L, 05-L, 07-L, 09-L, 11-L, 13-L, 15-L, 17-L, 19-L	Rated Accuracy: > 0.07% fs (0.000175 in wc)	Range: 0.0-0.25 in wc	Res.: 0.00001	Uncertainty: < 0.00035
#01-R, 03A-R, 05-R, 07-R, 09-R, 11-R, 13-R, 15-R, 17-R, 19-R	Rated Accuracy: > 0.06% fs (0.003 in wc)	Range: 0.0-5.0 in wc	Res.: 0.0001	Uncertainty: < 0.00348
#02-L, 04-L, 06-L, 08-L, 10-L, 12A-L, 14-L, 16-L, 18-L, 20-L	Rated Accuracy: > 0.06% fs (0.03 in wc)	Range: 0.0-50.0 in wc	Res.: 0.001	Uncertainty: < 0.0346

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Shortridge Instruments, Inc. AirData Multimeter Calibration Equipment

Customer Order Number, Meter Serial Number, and Test Type are referenced on page 1

LOW VELOCITY EQUIVALENT CONFIRMATION STANDARDS

Vel Eqv Transfer Standard S/N: M02009	Model ADM-870C	Mfgd & Calibrated by Shortridge Instruments, Inc.	Calibration Date: 08/15/23	Due Date: 08/2024
Vel Eqv Transfer Standard S/N: M02903	Model ADM-870C	Mfgd & Calibrated by Shortridge Instruments, Inc.	Calibration Date: 12/20/23	Due Date: 12/2024
Vel Eqv Transfer Standard S/N: M10839	Model ADM-870C	Mfgd & Calibrated by Shortridge Instruments, Inc.	Calibration Date: 10/25/23	Due Date: 10/2024
Vel Eqv Transfer Standard S/N: M10840	Model ADM-870C	Mfgd & Calibrated by Shortridge Instruments, Inc.	Calibration Date: 10/25/23	Due Date: 10/2024
Vel Eqv Transfer Standard S/N: M10897	Model ADM-870C	Mfg'd & Calibrated by Shortridge Instruments, Inc.	Calibration Date: 01/24/24	Due Date: 01/2025
Vel Eqv Transfer Standard S/N: M10901	Model ADM-870C	Mfg'd & Calibrated by Shortridge Instruments, inc.	Calibration Date: 12/20/23	Due Date: 12/2024
Vel Eqv Transfer Standard S/N: M13492	Model ADM-870C	Mfg'd & Calibrated by Shortridge Instruments, inc.	Calibration Date: 08/15/23	Due Date: 08/2024
Vel Eqv Transfer Standard S/N: M19325	Model ADM-870C	Mfgd & Calibrated by Shortridge Instruments, Inc.	Calibration Date: 06/06/24	Due Date: 06/2025
Rated Accuracy: Velocity ± 1.5 % ± 3.5 fpm		Range: 100-5000 fpm	Resolution: 0.1	Uncertainty: <5.00 fpm at 100 fpm; <7.50 fpm at 500 fpm

TEMPERATURE STANDARDS

RTD Simulator S/N: 249	Model RTD-1000/500	Mfgd by General Resistance	Calibrated by IET Labs	Calibration Date: 04/11/24	Due Date: 04/2028
RTD Simulator S/N: 250	Model RTD-1000/500	Mfgd by General Resistance	Calibrated by IET Labs	Calibration Date: 04/11/24	Due Date: 04/2028
RTD Simulator S/N: 253	Model RTD-1000/500	Mfgd by General Resistance	Calibrated by IET Labs	Calibration Date: 04/11/24	Due Date: 04/2028
RTD Simulator S/N: 254	Model RTD-1000/500	Mfgd by General Resistance	Calibrated by IET Labs	Calibration Date: 05/04/20	Due Date: 08/2024
RTD Simulator S/N: 256	Model RTD-1000/500	Mfgd by General Resistance	Calibrated by IET Labs	Calibration Date: 05/04/20	Due Date: 08/2024
RTD Simulator S/N: 257	Model RTD-1000/500	Mfgd by General Resistance	Calibrated by IET Labs	Calibration Date: 05/04/20	Due Date: 08/2024
RTD Simulator S/N: 292	Model RTD-1000/500	Mfgd by General Resistance	Calibrated by IET Labs	Calibration Date: 01/15/24	Due Date: 01/2028
RTD Simulator S/N: 293	Model RTD-1000/500	Mfgd by General Resistance	Calibrated by IET Labs	Calibration Date: 01/15/24	Due Date: 01/2028
RTD Simulator S/N: 294	Model RTD-1000/500	Mfgd by General Resistance	Calibrated by IET Labs	Calibration Date: 01/15/24	Due Date: 01/2028
RTD Simulator S/N: 313	Model RTD-1000/500	Mfgd by General Resistance	Calibrated by IET Labs	Calibration Date: 03/25/22	Due Date: 03/2026
RTD Simulator S/N: 314	Model RTD-1000/500	Mfgd by General Resistance	Calibrated by IET Labs	Calibration Date: 03/25/22	Due Date: 03/2026
RTD Simulator S/N: 315	Model RTD-1000/500	Mfgd by General Resistance	Calibrated by IET Labs	Calibration Date: 03/25/22	Due Date: 03/2026
RTD Simulator S/N: 316	Model RTD-1000/500	Mfgd by General Resistance	Calibrated by IET Labs	Calibration Date: 06/06/22	Due Date: 05/2026
RTD Simulator S/N: 317	Model RTD-1000/500	Mfgd by General Resistance	Calibrated by IET Labs	Calibration Date: 05/23/22	Due Date: 05/2026
RTD Simulator S/N: 318	Model RTD-1000/500	Mfgd by General Resistance	Calibrated by IET Labs	Calibration Date: 05/23/22	Due Date: 05/2026
Rated Accuracy: 0.025% of setting		Range: 100.00 Ω to 11111.10 Ω		Resolution: 0.01 Ω	Uncertainty: ≤ 32 ppm

Thermometer #1 S/N 8A089/Thermistor S/N A410660	Model 1504/5610	Mfgd by Hart Scientific	Calibrated by Fluke	Calibration Date: 04/09/24	Due Date: 04/2026
Thermometer #2 S/N 8B104/Thermistor S/N 871507	Model 1504/5610	Mfgd by Hart Scientific	Calibrated by Fluke	Calibration Date: 12/07/22	Due Date: 11/2024
Thermometer #5 S/N B11780/Thermistor S/N B10505	Model 1504/5610	Mfgd by Hart Scientific	Calibrated by Fluke	Calibration Date: 06/27/24	Due Date: 06/2026
Thermometer #6 S/N B11782/Thermistor S/N B10509	Model 1504/5610	Mfgd by Hart Scientific	Calibrated by Fluke	Calibration Date: 06/09/22	Due Date: 08/2024
Thermometer #7 S/N B49938/Thermistor S/N B482202	Model 1504/5610	Mfgd and Calibrated by Fluke		Calibration Date: 02/05/24	Due Date: 02/2026
Rated Accuracy(combined): 0.0324° F		Range: 32° F to 176° F	Resolution: 0.001° F	Combined Uncertainty with Baths: ≤ 0.040° F	

Temp Transfer Standard S/N M00136	Model ADM-870	Mfgd & Calibrated by Shortridge Instruments, Inc.	Calibration Date: 10/25/23	Due Date: 10/2024
Temp Transfer Standard S/N M96100	Model ADM-870	Mfgd & Calibrated by Shortridge Instruments, Inc.	Calibration Date: 03/21/24	Due Date: 03/2025
Rated Accuracy: 0.03° F	Range: 33° F to 158° F	Resolution: 0.01° F	Uncertainty: < 0.023° F	

Total combined Uncertainty for MultiTemp and TemProbe testing : ≤ 0.046° F

This form must remain with the Certificate of Calibration corresponding to the Customer Order Number and Meter Serial Number referenced on page 1.

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Shortridge Instruments, Inc. AirData Multimeter Calibration Equipment

Order Number: 240741 Serial Number: TP-M24283 Test Type: (Initial) As-Received Final

ABSOLUTE PRESSURE STANDARDS

ADM #02-R	S/N: 41741/42451	Heise Model: PPM-2	Mfgd by Dresser Industries	Calibrated by Ashcroft	Calibration Date: 08/16/23	Due Date: 08/2024
ADM #04-R	S/N: 41743/42453	Heise Model: PPM-2	Mfgd by Dresser Industries	Calibrated by Ashcroft	Calibration Date: 05/28/24	Due Date: 05/2025
ADM #06-R	S/N: 41742/42452-1	Heise Model: PPM-2	Mfgd by Dresser Industries	Calibrated by Ashcroft	Calibration Date: 11/28/23	Due Date: 11/2024
ADM #08-R	S/N: 42186/43328	Heise Model: PPM-2	Mfgd by Dresser Industries	Calibrated by Ashcroft	Calibration Date: 07/14/23	Due Date: 10/2024
ADM #10-R	S/N: 42203/43352	Heise Model: PPM-2	Mfgd by Dresser Industries	Calibrated by Ashcroft	Calibration Date: 05/25/23	Due Date: 08/2024
ADM #12A-R	S/N: 45605/48491	Heise Model: PPM-2	Mfgd by Dresser Industries	Calibrated by Ashcroft	Calibration Date: 11/02/23	Due Date: 11/2024
ADM #14-R	S/N: 43412/45043-3	Heise Model: PPM-2	Mfgd by Dresser Industries	Calibrated by Ashcroft	Calibration Date: 06/07/24	Due Date: 06/2025
ADM #16-R	S/N: 43413/45044	Heise Model: PPM-2	Mfgd by Dresser Industries	Calibrated by Ashcroft	Calibration Date: 06/24/24	Due Date: 06/2025
ADM #18-R	S/N: 44581/46845-2	Heise Model: PPM-2	Mfgd & Calibrated by Ashcroft, Inc.		Calibration Date: 04/09/24	Due Date: 04/2025
ADM #20-R	S/N: 44582/46847	Heise Model: PPM-2	Mfgd & Calibrated by Ashcroft, Inc.		Calibration Date: 09/14/23	Due Date: 09/2024

#02-R, 04-R, 06-R, 08-R, 10-R, 12A-R, 14-R, 16-R	Rated Accuracy: 0.05% fs (0.0305 in Hg)	Range: 0-30 psia	Resolution: 0.01	Uncertainty: < 0.0358
#18-R, 20-R	Rated Accuracy: 0.05% fs (0.0305 in Hg)	Range: 0-60 in Hg	Resolution: 0.001	Uncertainty: < 0.0358

DIFFERENTIAL PRESSURE STANDARDS

ADM #01-L	S/N: 41739/42449	Heise Model: PPM-1	Mfgd by Dresser Industries	Calibrated by Ashcroft	Calibration Date: 08/17/23	Due Date: 08/2024
ADM #01-R	S/N: 41739/42446	Heise Model: PPM-1	Mfgd by Dresser Industries	Calibrated by Ashcroft	Calibration Date: 08/17/23	Due Date: 08/2024
ADM #02-L	S/N: 41741/42454	Heise Model: PPM-1	Mfgd by Dresser Industries	Calibrated by Ashcroft	Calibration Date: 08/16/23	Due Date: 08/2024
ADM #03A-L	S/N: 45570/48461	Heise Model: PPM-1	Mfgd by Dresser Industries	Calibrated by Ashcroft	Calibration Date: 05/24/24	Due Date: 05/2025
ADM #03A-R	S/N: 45570/48460	Heise Model: PPM-1	Mfgd by Dresser Industries	Calibrated by Ashcroft	Calibration Date: 05/16/24	Due Date: 05/2025
ADM #04-L	S/N: 41743/42456	Heise Model: PPM-1	Mfgd by Dresser Industries	Calibrated by Ashcroft	Calibration Date: 05/10/24	Due Date: 05/2025
ADM #05-L	S/N: 41740/42450	Heise Model: PPM-1	Mfgd by Dresser Industries	Calibrated by Ashcroft	Calibration Date: 12/01/23	Due Date: 11/2024
ADM #05-R	S/N: 41740/42447	Heise Model: PPM-1	Mfgd by Dresser Industries	Calibrated by Ashcroft	Calibration Date: 12/01/23	Due Date: 11/2024
ADM #06-L	S/N: 41742/42455	Heise Model: PPM-1	Mfgd by Dresser Industries	Calibrated by Ashcroft	Calibration Date: 12/01/23	Due Date: 11/2024
ADM #07-L	S/N: 42185/42186	Heise Model: PPM-1	Mfgd by Dresser Industries	Calibrated by Ashcroft	Calibration Date: 07/14/23	Due Date: 10/2024
ADM #07-R	S/N: 42185/43326	Heise Model: PPM-1	Mfgd by Dresser Industries	Calibrated by Ashcroft	Calibration Date: 07/14/23	Due Date: 10/2024
ADM #08-L	S/N: 42186/43329	Heise Model: PPM-1	Mfgd by Dresser Industries	Calibrated by Ashcroft	Calibration Date: 07/14/23	Due Date: 10/2024
ADM #09-L	S/N: 42202/43351	Heise Model: PPM-1	Mfgd by Dresser Industries	Calibrated by Ashcroft	Calibration Date: 05/30/23	Due Date: 08/2024
ADM #09-R	S/N: 42202/43350	Heise Model: PPM-1	Mfgd by Dresser Industries	Calibrated by Ashcroft	Calibration Date: 05/30/23	Due Date: 08/2024
ADM #10-L	S/N: 42203/43353	Heise Model: PPM-1	Mfgd by Dresser Industries	Calibrated by Ashcroft	Calibration Date: 05/26/23	Due Date: 08/2024
ADM #11-L	S/N: 43165/44551-1	Heise Model: PPM-1	Mfgd by Dresser Industries	Calibrated by Ashcroft	Calibration Date: 11/07/23	Due Date: 11/2024
ADM #11-R	S/N: 43165/44730	Heise Model: PPM-1	Mfgd by Dresser Industries	Calibrated by Ashcroft	Calibration Date: 11/07/23	Due Date: 11/2024
ADM #12A-L	S/N: 45605/48490-1	Heise Model: PPM-1	Mfgd by Dresser Industries	Calibrated by Ashcroft	Calibration Date: 11/03/23	Due Date: 11/2024
ADM #13-L	S/N: 43415/45041	Heise Model: PPM-1	Mfgd by Dresser Industries	Calibrated by Ashcroft	Calibration Date: 06/21/24	Due Date: 06/2025
ADM #13-R	S/N: 43415/45039	Heise Model: PPM-1	Mfgd by Dresser Industries	Calibrated by Ashcroft	Calibration Date: 06/21/24	Due Date: 06/2025
ADM #14-L	S/N: 43412/45045	Heise Model: PPM-1	Mfgd by Dresser Industries	Calibrated by Ashcroft	Calibration Date: 06/20/24	Due Date: 06/2025
ADM #15-L	S/N: 43416/45042	Heise Model: PPM-1	Mfgd by Dresser Industries	Calibrated by Ashcroft	Calibration Date: 06/26/24	Due Date: 06/2025
ADM #15-R	S/N: 43416/45040-1	Heise Model: PPM-1	Mfgd by Dresser Industries	Calibrated by Ashcroft	Calibration Date: 06/26/24	Due Date: 06/2025
ADM #16-L	S/N: 43413/45046	Heise Model: PPM-1	Mfgd by Dresser Industries	Calibrated by Ashcroft	Calibration Date: 06/26/24	Due Date: 06/2025
ADM #17-L	S/N: 44579/46842	Heise Model: PPM-1	Mfgd & Calibrated by Ashcroft, Inc.		Calibration Date: 04/04/24	Due Date: 04/2025
ADM #17-R	S/N: 44579/46841	Heise Model: PPM-1	Mfgd & Calibrated by Ashcroft, Inc.		Calibration Date: 04/04/24	Due Date: 04/2025
ADM #18-L	S/N: 44581/46846	Heise Model: PPM-1	Mfgd & Calibrated by Ashcroft, Inc.		Calibration Date: 04/04/24	Due Date: 04/2025
ADM #19-L	S/N: 44580/46844	Heise Model: PPM-1	Mfgd & Calibrated by Ashcroft, Inc.		Calibration Date: 10/04/23	Due Date: 09/2024
ADM #19-R	S/N: 44580/46843	Heise Model: PPM-1	Mfgd & Calibrated by Ashcroft, Inc.		Calibration Date: 10/04/23	Due Date: 09/2024
ADM #20-L	S/N: 44582/46848	Heise Model: PPM-1	Mfgd & Calibrated by Ashcroft, Inc.		Calibration Date: 10/04/23	Due Date: 09/2024

#01-L, 03A-L, 05-L, 07-L, 09-L, 11-L, 13-L, 15-L, 17-L, 19-L	Rated Accuracy: > 0.07% fs (0.000175 in wc)	Range: 0.0-0.25 in wc	Res.: 0.00001	Uncertainty: < 0.00035
#01-R, 03A-R, 05-R, 07-R, 09-R, 11-R, 13-R, 15-R, 17-R, 19-R	Rated Accuracy: > 0.06% fs (0.003 in wc)	Range: 0.0-5.0 in wc	Res.: 0.0001	Uncertainty: < 0.00348
#02-L, 04-L, 06-L, 08-L, 10-L, 12A-L, 14-L, 16-L, 18-L, 20-L	Rated Accuracy: > 0.06% fs (0.03 in wc)	Range: 0.0-50.0 in wc	Res.: 0.001	Uncertainty: < 0.0346

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Shortridge Instruments, Inc. AirData Multimeter Calibration Equipment

Customer Order Number, Meter Serial Number, and Test Type are referenced on page 1

LOW VELOCITY EQUIVALENT CONFIRMATION STANDARDS

Vel Eqv Transfer Standard S/N: M02009	Model ADM-870C	Mfgd & Calibrated by Shortridge Instruments, Inc.	Calibration Date: 08/15/23	Due Date: 08/2024
Vel Eqv Transfer Standard S/N: M02903	Model ADM-870C	Mfgd & Calibrated by Shortridge Instruments, Inc.	Calibration Date: 12/20/23	Due Date: 12/2024
Vel Eqv Transfer Standard S/N: M10839	Model ADM-870C	Mfgd & Calibrated by Shortridge Instruments, Inc.	Calibration Date: 10/25/23	Due Date: 10/2024
Vel Eqv Transfer Standard S/N: M10840	Model ADM-870C	Mfgd & Calibrated by Shortridge Instruments, Inc.	Calibration Date: 10/25/23	Due Date: 10/2024
Vel Eqv Transfer Standard S/N: M10897	Model ADM-870C	Mfg'd & Calibrated by Shortridge Instruments, Inc.	Calibration Date: 01/24/24	Due Date: 01/2025
Vel Eqv Transfer Standard S/N: M10901	Model ADM-870C	Mfg'd & Calibrated by Shortridge Instruments, inc.	Calibration Date: 12/20/23	Due Date: 12/2024
Vel Eqv Transfer Standard S/N: M13492	Model ADM-870C	Mfg'd & Calibrated by Shortridge Instruments, inc.	Calibration Date: 08/15/23	Due Date: 08/2024
Vel Eqv Transfer Standard S/N: M19325	Model ADM-870C	Mfgd & Calibrated by Shortridge Instruments, Inc.	Calibration Date: 06/06/24	Due Date: 06/2025
Rated Accuracy: Velocity ± 1.5 % ± 3.5 fpm		Range: 100-5000 fpm	Resolution: 0.1	Uncertainty: <5.00 fpm at 100 fpm; <7.50 fpm at 500 fpm

TEMPERATURE STANDARDS

RTD Simulator S/N: 249	Model RTD-1000/500	Mfgd by General Resistance	Calibrated by IET Labs	Calibration Date: 04/11/24	Due Date: 04/2028
RTD Simulator S/N: 250	Model RTD-1000/500	Mfgd by General Resistance	Calibrated by IET Labs	Calibration Date: 04/11/24	Due Date: 04/2028
RTD Simulator S/N: 253	Model RTD-1000/500	Mfgd by General Resistance	Calibrated by IET Labs	Calibration Date: 04/11/24	Due Date: 04/2028
RTD Simulator S/N: 254	Model RTD-1000/500	Mfgd by General Resistance	Calibrated by IET Labs	Calibration Date: 05/04/20	Due Date: 08/2024
RTD Simulator S/N: 256	Model RTD-1000/500	Mfgd by General Resistance	Calibrated by IET Labs	Calibration Date: 05/04/20	Due Date: 08/2024
RTD Simulator S/N: 257	Model RTD-1000/500	Mfgd by General Resistance	Calibrated by IET Labs	Calibration Date: 05/04/20	Due Date: 08/2024
RTD Simulator S/N: 292	Model RTD-1000/500	Mfgd by General Resistance	Calibrated by IET Labs	Calibration Date: 01/15/24	Due Date: 01/2028
RTD Simulator S/N: 293	Model RTD-1000/500	Mfgd by General Resistance	Calibrated by IET Labs	Calibration Date: 01/15/24	Due Date: 01/2028
RTD Simulator S/N: 294	Model RTD-1000/500	Mfgd by General Resistance	Calibrated by IET Labs	Calibration Date: 01/15/24	Due Date: 01/2028
RTD Simulator S/N: 313	Model RTD-1000/500	Mfgd by General Resistance	Calibrated by IET Labs	Calibration Date: 03/25/22	Due Date: 03/2026
RTD Simulator S/N: 314	Model RTD-1000/500	Mfgd by General Resistance	Calibrated by IET Labs	Calibration Date: 03/25/22	Due Date: 03/2026
RTD Simulator S/N: 315	Model RTD-1000/500	Mfgd by General Resistance	Calibrated by IET Labs	Calibration Date: 03/25/22	Due Date: 03/2026
RTD Simulator S/N: 316	Model RTD-1000/500	Mfgd by General Resistance	Calibrated by IET Labs	Calibration Date: 06/06/22	Due Date: 05/2026
RTD Simulator S/N: 317	Model RTD-1000/500	Mfgd by General Resistance	Calibrated by IET Labs	Calibration Date: 05/23/22	Due Date: 05/2026
RTD Simulator S/N: 318	Model RTD-1000/500	Mfgd by General Resistance	Calibrated by IET Labs	Calibration Date: 05/23/22	Due Date: 05/2026
Rated Accuracy: 0.025% of setting		Range: 100.00 Ω to 11111.10 Ω		Resolution: 0.01 Ω	Uncertainty: ≤ 32 ppm

Thermometer #1 S/N 8A089/Thermistor S/N A410660	Model 1504/5610	Mfgd by Hart Scientific	Calibrated by Fluke	Calibration Date: 04/09/24	Due Date: 04/2026
Thermometer #2 S/N 8B104/Thermistor S/N 871507	Model 1504/5610	Mfgd by Hart Scientific	Calibrated by Fluke	Calibration Date: 12/07/22	Due Date: 11/2024
Thermometer #5 S/N B11780/Thermistor S/N B10505	Model 1504/5610	Mfgd by Hart Scientific	Calibrated by Fluke	Calibration Date: 06/27/24	Due Date: 06/2026
Thermometer #6 S/N B11782/Thermistor S/N B10509	Model 1504/5610	Mfgd by Hart Scientific	Calibrated by Fluke	Calibration Date: 06/09/22	Due Date: 08/2024
Thermometer #7 S/N B49938/Thermistor S/N B482202	Model 1504/5610	Mfgd and Calibrated by Fluke		Calibration Date: 02/05/24	Due Date: 02/2026
Rated Accuracy(combined): 0.0324° F		Range: 32° F to 176° F	Resolution: 0.001° F	Combined Uncertainty with Baths: ≤ 0.040° F	

Temp Transfer Standard S/N M00136	Model ADM-870	Mfgd & Calibrated by Shortridge Instruments, Inc.	Calibration Date: 10/25/23	Due Date: 10/2024
Temp Transfer Standard S/N M96100	Model ADM-870	Mfgd & Calibrated by Shortridge Instruments, Inc.	Calibration Date: 03/21/24	Due Date: 03/2025
Rated Accuracy: 0.03° F	Range: 33° F to 158° F	Resolution: 0.01° F	Uncertainty: < 0.023° F	

Total combined Uncertainty for MultiTemp and TemProbe testing : ≤ 0.046° F

This form must remain with the Certificate of Calibration corresponding to the Customer Order Number and Meter Serial Number referenced on page 1.

Shortridge Instruments, Inc.
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Calibration Services Inc.
615 Aldrich Street Uxbridge, MA 01569 508-278-2932, C-508-523-8684
E-mike@calibrationservicesinc.com,

CERTIFICATE OF CALIBRATION
Performance Summary

Climet aerosol particle counter, model: CI-750t S/N: 057182 **Unit ID**: 7182

Cal date: 06 Apr 2024 **Due date:** 30 Apr 2025

PREPARED FOR: CCS, NORTH SMITHFIELD, RI

CALIBRATION PRCEDURE NO; 92045102

Physical condition upon receipt: ___ not applicable
x good ___ damaged ___ poorly packaged ___ rough handling

Condition of calibration, as found: condition, as left
__ new unit x in tolerance __ out of tolerance x to specifications

Comments: None.

Calibration parameters: Laser Power and Peak Noise are recorded for reference purposes only. Air Flow is a critical parameter during calibration, because it establishes the nominal sample volume and it establishes particle velocity, which affects sizing. Because flow variances after calibration affects sample volume inversely, variances up to 10% have negligible effect on recorded counts. Particle response amplitudes correspond to detection thresholds. Amplitudes greater than thresholds will result in counts greater than normal. Amplitudes below thresholds will result in undercounting.

Calibration performed by: Mike DiLibero

Signed: Signed: _____ Date: 06 Apr 2024

Calibration Services Inc.
615 Aldrich Street Uxbridge, MA 01569 508-278-2932, C-508-523-8684
E-mike@calibrationservicesinc.com,

CALIBRATION TEST DATA

MODEL: CI-750t Aerosol Particle Counter S/N 057182 ID No: 7182

DATE OF CALIBRATION: 06 Apr 2024 Due: 30 Apr 2025

Condition of instrument upon receipt _X__ In tolerance ____ Out of tolerance

ELECTRONIC MEASUREMENTS

TEST	NOMINAL	TOLERANCE	AS FOUND	PASS	AS LEFT
L.D. current drive (voltage)	2064 mVdc	(reference)	2055 mVdc	N/A	2055 mVdc
AIR FLOW	75 LPM	+/- 3.8 LPM	75 LPM	Y	75 LPM
PEAK NOISE	<200 mV	(reference)	132 mV	N/A	132 mV

^Initial value; the voltage increases as the laser diode ages

PERFORMANCE DATA

NOMINAL PARTICLE SIZE	0.3 UM	0.5 UM	1.0 UM		5.0 UM
EXPECTED AMPLITUDE (last cal)	305 mV	313 mV	.931 V		413 mV
TOLERANCE	+/- 60 mV	+/- 30 mV	+/-165 mV		+/- 50 mV
AS FOUND	311 mV	318 mV	941 V		444 mV
PASS (Y/N)	Y	Y	Y		Y
AS LEFT	311 mV	318 mV	941 V		444 mV

COLLECTIVE UNCERTAINTY OF MEASUREMENT: +/- 2.3% AT 0.3 UM AND 0.5 UM; +/- 3.5% AT 5 UM.
The collective uncertainty is based on the contribution of the Pulse Height Analyzer, the Mass Flow Meter, and the judgement of the technician in establishing the median of the displayed distribution, as determined by empirical tests and 1 sigma uncertainty calculation.

ACCURACY RATIO: The collective uncertainty of the measurement standard is less than 25% of the listed tolerances (4:1 measurement ratio).

CALIBRATION TOLERANCES: The particle sizes listed are nominal; refer to the Test Equipment Record for actual sizes. Tolerance voltages listed represent a 2% sizing error and the particle deviation from the size. If the particle response is below the tolerance for *Expected Amplitude* the particle will be sized larger than it actually is, resulting in counts that are greater than they actually should be. The actual counts cannot be extrapolated from the out-of-tolerance counts. Temperature and Humidity sensors, if present, are for reference, and are not part of the calibration.

Technician: Mike DiLibero

Calibration Services Inc.
615 Aldrich St., Uxbridge, MA 01569 508-278-2932, Cell 508-523-8684
Email; mike@calibrationservicesinc.com,

CERTIFICATE OF CALIBRATION
Standards of Traceability

UNIT ID: 7182

DOCUMENT DATE: 06 Apr 2024

STATEMENT OF TRACEABILITY

This instrument has been calibrated in accordance with ISO 10012-1 and ISO 17025

Temperature and Relative Humidity are not controlled during calibration because of the wide operating range of the instrument. (Temperature:30 deg F to 120 deg F Humidity:0-100%, non-condensing).

All test equipment used in the calibration of Calibration Services Inc.'s' products is calibrated at manufacturer Recommended intervals by an approved outside calibration service. Calibration certificates for each piece of test equipment is on file at Calibration Services Inc: copies will be supplied if requested.

Calibration traceability to a National Measurement Standard (NMS) is established by using monodisperse latex spheres as a calibration standard. These spheres are sized by methods traceable, by lot number, to the National Institute of Standards and Technology.

The instruments and reference standards listed below were used to calibrate the instrument certified by this document.

CALIBRATION METHOD

Climet particle counters are calibrated by using one or more sizes of polystyrene latex spheres, which serve as standards for comparing and adjusting amplifier response to known particle sizes. The particles are introduced to the sensor as an aerosol sample with moderate concentration. The digital voltmeter is used to make reference measurements. The oscilloscope is used for reference during calibration, and as a tool to evaluate the condition of the sensor. The Pulse Height Analyzer (PHA) is the primary calibration instrument. It is used to collect particle pulses produced by the test particles; these form a distribution of pulses on the PHA display.

The PHA provides the requisite resolution to determine the mediation of the distribution. The amplifier circuitry is adjusted, as needed, to bring the median distribution to the amplitude specified for a given particle standard. Initial factory prime calibration includes verification of count efficiency by count comparison with CDC/DMA or with a reference particle counter used as a transfer standard.

Equipment	Make and Model	Serial Number		Cal Date	Cal Due Date
Pulse Height	**Amptek MCA 8000**	**000839**		**04 Aug 2023**	**31 Aug 2024**
Analyzer	**Amptek MCA 8000**	**000671**		**08 Aug 2023**	**31 Aug 2024**
DVM	**Fluke 117C**	**55690400WS**		**28 Aug 2023**	**31 Aug 2024**
Oscilloscope	**TDS220**	**BO71196**		**28 Aug 2023**	**31 Aug 2024**
Rotronic	**Hygrometer S1**	**44949**		**28 Aug 2023**	**31 Aug 2024**
Flow Meter	**4040**	**40401024010**		**05 Aug 2023**	**31 Aug 2024**
Flow Meter	**4040**	**40401829008**		**22 Aug 2023**	**31 Aug 2024**
Particle Counter	**CI-88R**	**104148**		**31 Aug 2023**	**31 Aug 2024**
Particle Counter	**CI-88R**	**103962**		**23 Oct 2023**	**31 Oct 2024**
Digital Stopwatch	**1051**	**111599574**		**28 Aug 2023**	**31 Aug 2024**

PARTICLE STANDARDS

NOMINAL SIZE	ACTUAL SIZE	SIZE DEVIATION	LOT NUMBER	EXP. DATE		NOMINAL SIZE	ACTUAL SIZE	SIZE DEVIATION	LOT NUMBER	EXP. DATE
300 nm	303 nm	+/- 6 nm	244496	**9/2024**		1.0 um	1.025 um	+/-0.018um	260019	**10/2025**
500 nm	508 nm	+/- 8 nm	250693	**2/2025**		3.0 um	2.998 um	+/- 0.032um	264186	**2/2026**
800 nm	803 nm	+/- 14 nm	259413	**9/2025**		10.0 um	10.13 um	+/-0.06 um	259536	**9/2025**
5.0 um	5.049 um	+/- 0.38 um	240527	**5/2024**		25 um	25.09 um	+/-0.26 um	262205	**12/2025**

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CERTIFICATE OF CALIBRATION
COUNT EFFICIENCY

MODEL: CI-750t Aerosol Particle Counter S/N: 057182 ID:7182 has been checked for 50%

And 100% count efficiency by comparison with the CI-88R reference counter

NOMINAL	ACTUAL SIZE	SIZE DEVIATION	EFFECIENCY @ SIZE	AS FOUND	PASS
0.3 um	303 nm	+/-6 nm	ISO-21051 Spec 30-70%	51%	Y
0.5 um	508 nm +/- 8nm	+/-8 nm	ISO 210501 Spec 30-70%	48%	Y
0.5 um	508 nm +/-8nm	+/-8 nm	ISO 210501 Spec 90-110%	95%	Y

INSTRUMENT	MODEL	SERIAL NUMBER	CAL DATE	DUE DATE
COMARITOR	CLIMET I-88R	103962	23 Oct 2023	31 Oct 2024

Resolution test

ISO SPEC: EQUAL TO OR LESS THAN 15% Results: 12 Pass: X

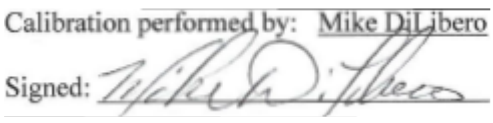
False Count Rate Testing

Allowable counts per CM at 95% Upper Confidence Limit, by flow rate:
Results Based On One Ten-Minute Sample
75 LPM: 9.2 counts

TEST CHANNEL	COUNTS IN 10 MINUTES	95% UCL COUNTS PER CUBIC METER	PASS	% OF CLASS 5 LIMIT
0.3 um	0	10.6	Y	0.10%
0.5 um	0	10.6	Y	0.30%

UNCERTAINTY O F MEASUREMENT: +/- 2.1% for 50% count efficiency: +/- 1.9% for 100% count efficiency: +/-0.6% for resolution. The collective uncertainty for count efficiency and resolution are represented in percentage points, to be added – not a percentage of the measurement. The uncertainty represents a 95% confidence interval where k=2.

Calibration performed by: Mike DiLibero

Signed: 

Date: 06 Apr 2024

Document of Certification

CERTIFICATION & CALIBRATION SERVICES, INC.

CERTIFIES THAT

AGILE MEDICAL PACKAGING AND DEVICES

1120 Jupiter Road, Suite 190
Plano, TX 75074

Cleanroom & Gown Room

Have been tested to meet performance parameters as outlined in
ISO 14644-1:2015 as follows:

Area	***ISO 14644-1:2015***
Cleanroom	ISO Class 6 @ 0.5 microns (At Rest)
Gown Room	ISO Class 7 @ 0.5 microns (At Rest)

This 8th Day of November 2024
By

Certification and Calibration Service
NEBB
DAVID BOWMAN
CERTIFICATION
3217
Exp. 12/31/24
Cleanroom Performance Testing

David Bowman
CERTIFICATION & CALIBRATION SERVICES, INC.
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