



**Guaranteed Effortless Control**



December 31, 2020

Drive Savers, Inc  
400 Bel Marin Keys Blvd.  
Novato, CA 94949

---

Environmental Testing was performed in the following cleanroom areas at  
*Drive Savers, Inc., on December 21<sup>st</sup>, 2020*

AREA	CLASSIFICATION	SQ. FOOTAGE	RESULT
Cleanroom A	ISO Class 5	440	<b>Compliant</b>
Cleanroom B	ISO Class 5	630	<b>Compliant</b>

Measurements were made to determine airborne particle concentrations, airflow velocities, temperature and humidity and room differential air pressure.

All measurements are made in accordance with ISO 14644-1 2015, ISO 14644-2: 2015, or ISO 14644-3: 2019 applicable standards, methods, and practices currently in effect. By issuing this report, Advanced Cleanroom Microclean Corporation accepts full responsibility for the accuracy of measurements and reported results at the time the measurements are made. This report and original data on file shall remain proprietary to Drive Savers, Inc.

Measurements and data recording are made by Brian Enright.

Please feel free to call anytime if you have any questions regarding this report.

Sincerely,  
ADVANCED CLEANROOM MICROCLEAN CORPORATION.

Saumolia Amisone

# 1 ACM Testing Parameters

## 1.1 Airborne Particle Count

**PURPOSE:** To measure the particle levels in the cleanroom in order to maintain compliance to ISO 14644-1:2015

**INSTRUMENTATION:** Discrete Particle Counter - Calibration documents on equipment used for certification are attached to the report.

**PROCEDURES:** Divide the Cleanroom work zone into grids of equal proportion. Place the particle counter probe into the direction of airflow at a working height of 36"-40" above floor level. Record and report data for each considered particle size for the designated classification.

Place the particle counter at the specified sampling location and set up the flow rate at 1.0 CFM for a minimum duration of one minute per location. Select the particle size threshold(s) in accordance with ISO 14644-1: 2015. The transit(sampling) tube from the sample probe inlet to the particle counter sensor should be as short as possible. For sampling of particles larger than and equal to 1 $\mu$ m, the transit tube length should not exceed the manufacturer's recommended length and diameter. This sampling procedure can be found in ISO 14644-3: 2019 Annex B.

**ACCEPTANCE:** The average particle concentration at each sample location shall fall at or below class limit, and the total averages shall fall at or below the class limit.

**1.2 Airborne Particulate Cleanliness Classes****ISO - 14644-1:2015**

<b>CLASS</b>	<b>0.1 MICRON</b>	<b>0.2 MICRON</b>	<b>0.3 MICRON</b>	<b>0.5 MICRON</b>	<b>1.0 MICRON</b>	<b>5.0 MICRONS</b>
ISO 1	10	-	-	-	-	-
ISO 2	100	24	10	-	-	-
ISO 3	1,000	237	102	35	-	-
ISO 4	10,000	2,370	1,020	352	83	-
ISO 5	100,000	23,700	10,200	3,520	832	-
ISO 6	1,000,000	237,000	102,000	35,200	8,320	293
ISO 7	-	-	-	352,000	83,200	2,930
ISO 8	-	-	-	3,520,000	832,000	29,300
ISO 9	-	-	-	35,200,000	8,320,000	293,000

***AVERAGE, MEAN, STANDARD DEVIATION AND STANDARD ERROR:******AVERAGE PARTICLE CONCENTRATION:***

$$A = \frac{C_1 + C_2 + \dots + C_N}{N}$$

Where  $C_1, C_2, C_N$  = Individual particle counts  
 $N$  = Number of particle counts taken at each location.

***MEAN OF AVERAGES:***

$$M = \frac{A_1 + A_2 + \dots + A_N}{L}$$

Where  $A_1, A_2, \dots, A_N$  = Average particle concentrations at each location.  
 $L$  = Number of locations.

***STANDARD DEVIATION:***

$$SD = \sqrt{\frac{(A_1 - M)^2 + (A_2 - M)^2 \dots (A_N - M)^2}{L-1}}$$

Where  $A_1, A_2, \dots, A_N$  = Average particle concentrations at particular locations

$M$  = Mean of Averages

$L$  = Number of Locations

***STANDARD ERROR:***

$$SE = \frac{SD}{\sqrt{L}}$$

---

Where  $SD$  = Standard Deviation and  $L$  = Number of Locations

### 1.3 HEPA Filter Air Flow Velocity

**PURPOSE:** To determine the volume of air delivered through each HEPA filter and to calculate the average airflow and room air exchange rate, within the Cleanroom.

**INSTRUMENTATION:** A Digital Anemometer used in combination with a multi-point tube array - Calibration documents for equipment used for testing will be included in the certification reports.

**PROCEDURES:**

1. ISO 14644-3: 2019 section B-4.3.3

Supply airflow rate calculated from filter face velocity

Evaluation of the supply airflow rate without a flowhood may be done with an anemometer downstream of each final filter. The supply airflow rate is determined from the airflow velocity multiplied by the area of exit. A curtain may be used to exclude disturbances to the unidirectional airflow.

For the number of measuring points and the calculation of supply airflow rate, refer to B.4.2.3 and B.4.2.4, respectively. If it is impossible to divide the plane into grid cells of equal areas, the average air velocity weighted by area may be substituted.

2. ISO 14644-3: 2019 section B.4.2.2

Supply airflow velocity

The airflow velocity should be measured at approximately 150 mm to 300 mm from the filter face. The number of measuring points should be sufficient to determine the supply airflow rate in cleanrooms and clean zones, and should be the square root of 10 times of area in square meters but no less than 4. At least one point should be measured for each filter outlet or fan-filter unit. A curtain may be used to exclude disturbances to the unidirectional airflow.

The measuring time at each position should be also sufficient to ensure a repeatable reading. Time-averaged values of measured velocities should be recorded for multiple locations.

## 3. ISO 14644-3: 2019 B.4.2.4

Supply airflow rate measured by filter face velocity

The results of the airflow velocity test carried out in accordance with B.4.2.2 can be used to calculate the total supply airflow rate as follows:

$$Q = \sum (U_c \times A_c)$$

$Q$  is the total airflow rate;

$U_c$  is the airflow velocity at each cell centre;

$A_c$  is the cell area which is defined as the installation area divided by the number of measuring points;

$\sum$  is the summation for all cells.

**ACCEPTANCE:** The average airflow velocity or the average or total airflow volume for the cleanroom or clean zone should be within  $\pm$  of the value specified for the cleanroom or clean zone, or within other tolerance limits agreed upon by the buyer and seller.

## 1.4 Temperature

**PURPOSE:** To verify the capability of the Cleanroom air handling equipment to maintain temperature within design specification.

**INSTRUMENTATION:** Temperature & Humidity Probe - Calibration documents for equipment used in testing are included in the certification report.

1. **PROCEDURES:** This test is recommended for areas where temperature and moisture levels are primarily controlled for purposes of worker comfort rather than process or equipment requirements. When processes require strict temperature control, a more comprehensive test is performed.
2. Allow room to operate for 24 hours before testing.
3. ISO 14644-3:2005 Section B.8.2.2 Comprehensive temperature test  
This test is recommended for areas having strict environmental control specifications. This test should be performed at least 1 hour after the air-conditioning system has been operated and the conditions have been stabilized. The work zone should be divided into a grid of equal areas. Individual testing areas should be selected by agreement between the customer and supplier. The number of measuring locations should be at least two-The temperature probe should be positioned at work-level height and at a distance of no less than 300 mm from the ceiling, walls, or floor of the installation. The probe position should be selected with due consideration of the presence of heat sources. Measurements are taken in conjunction with the particle count sample duration per location unless otherwise specified.

**ACCEPTANCE:** Temperature and uniformity requirements are a matter for agreement between the buyer and the seller.

## 1.5 Humidity

**PURPOSE:** To verify that the system humidity control of the Cleanroom is working at the acceptance level. Humidity control is necessary to:

3. Prevent corrosion and/or oxidation.
4. Prevent condensation on work surfaces.
5. Reduce static electricity.
6. Provide personnel comfort.
7. Prevent product contamination.
8. Compensate for hygroscopic materials.
9. Control microbial growth.

**INSTRUMENTATION:** Temperature & Humidity Probe - Calibration documents for equipment used for testing are included in the certification report.

**PROCEDURES:** ISO 14644-3:2005 Section B.9.2 Procedure for humidity test  
The test is performed following completion of the airflow uniformity tests and the adjustment of air-conditioning system controls. This test should be performed with the air-conditioning system fully operational and when stable conditions have been achieved. The humidity sensor should be located at least at one location for each humidity control zone, and sufficient time should be allowed for the sensor to stabilize. The humidity test should be performed in conjunction with the temperature test. Measurements are taken in conjunction with the particle count sample duration per location unless otherwise specified.

**ACCEPTANCE:** Humidity and uniformity requirements are a matter for agreement between the buyer and the seller.



## 1.6 Room Pressurization

**PURPOSE:** To verify that a differential pressure should be maintained between the rooms sufficient to assure airflow outward progressively from the cleanest spaces to the least clean during normal operation and during periods of temporary upsets in air balance, as when a door connecting two (2) rooms is suddenly opened.

**INSTRUMENTATION:** A Digital Anemometer - Calibration documents for equipment used in testing are included in certification report.

**PROCEDURES:** ISO 14644-3: 2019 Section B.5.2 Procedure for air pressure difference test. It is advisable to confirm that the supply air volume and installation balancing are within specifications before commencing the measurement of differential pressure between rooms or between rooms and outside areas. With all doors closed, the pressure difference between the cleanroom and any surrounding environment should be measured and recorded. If the installation is subdivided into more than one cleanroom, the pressure differences between the innermost room and the next adjacent room should be measured. The measurement should be continued until the pressure difference between the last enclosure and surrounding ancillary environment and against the external environment is measured. The pressures being measured are very small and incorrect measurement techniques can easily give erroneous readings. The following should be considered:

- a) installation of permanent measuring points is recommended;
- b) take measurements as close a possible to the middle of the cleanroom and away from any supply air inlets or return air outlet devices which may influence the local pressure at the measuring point.

**ACCEPTANCE:** Pressurization and uniformity requirements are a matter for agreement between the buyer and the seller.

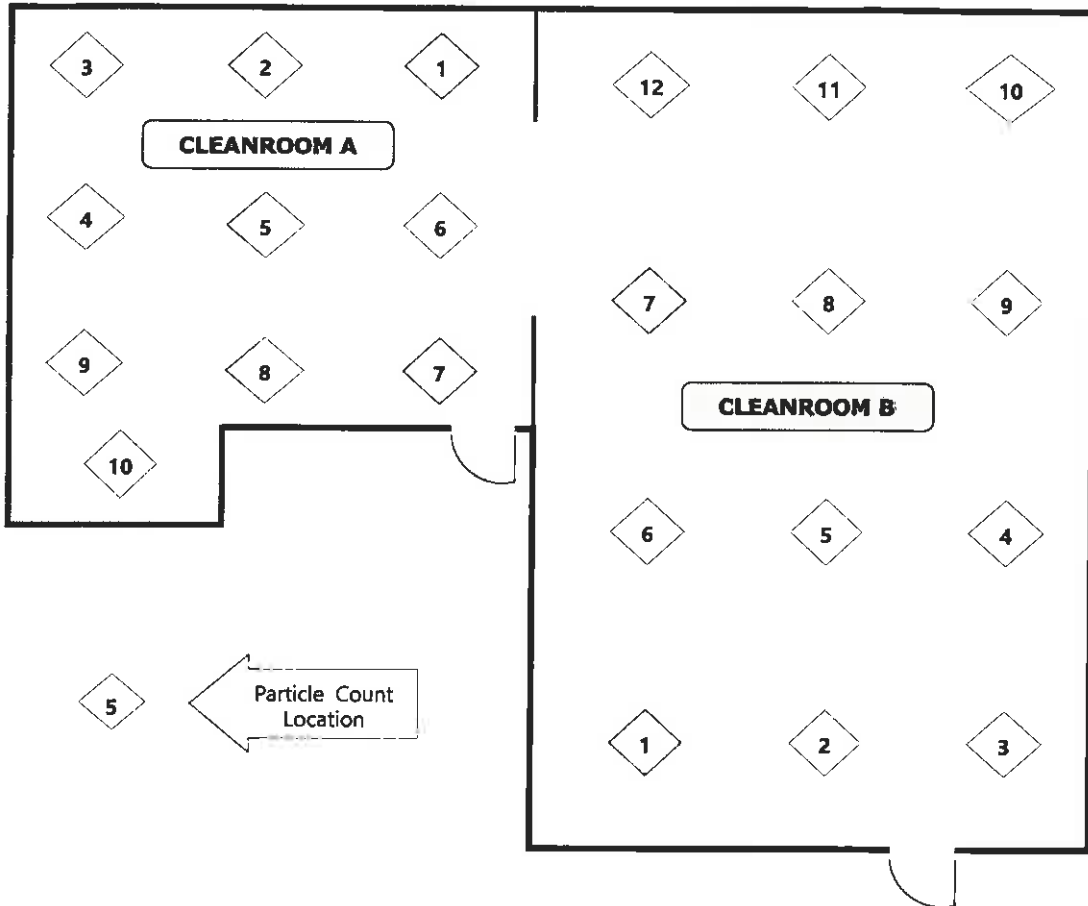
## 2 Equipment Calibration Summary

Type of Test	Manufacturer	Model	Serial	Cal. Due Date
<i>Non-Viable Particle Counts</i>	Beckman Coulter	3400+	C38675-2020330012	08/13/2021
<i>Air Velocity/Volume</i>	TSI Alnor	EBT730	EBT732033006	08/12/2021
<i>Room Diff. Pressure</i>	TSI Alnor	EBT730	EBT732033006	08/12/2021
<i>Temperature &amp; Humidity</i>	Beckman Coulter	HMP110	S3320270	08/11/2021
<i>Viable Air Sampling</i>	N/A	N/A	N/A	N/A

### **3 Report Content**

Pages are organized by area. Each section may include a sketch of the Cleanroom showing particle count locations, particle count data, temperature, humidity, room air pressure and airflow data. The report sections conclude with summary data and statement of certification, followed by certificates of compliance.

### CLEANROOM A & B PARTICLE COUNT SAMPLING LOCATION DIAGRAM



Initials B2 Date 09 JAN 2021

**CLEANROOM A AIRBORNE PARTICLE COUNT DATA**

<b>SAMPLE LOCATION (ISO Class 5)</b>	<b>0.5 MICRONS (Limit 3,520)</b>	<b>5.0 MICRONS (Limit N/A)</b>
1	0	0
2	71	36
3	0	0
4	0	0
5	36	0
6	71	0
7	0	0
8	0	0
9	0	0
10	0	0
<b>AVERAGE COUNT</b>	<b>17.9</b>	<b>3.6</b>
<b>STANDARD DEVIATION</b>	<b>30.3</b>	<b>11.3</b>
<b>STANDARD ERROR</b>	<b>9.6</b>	<b>3.6</b>

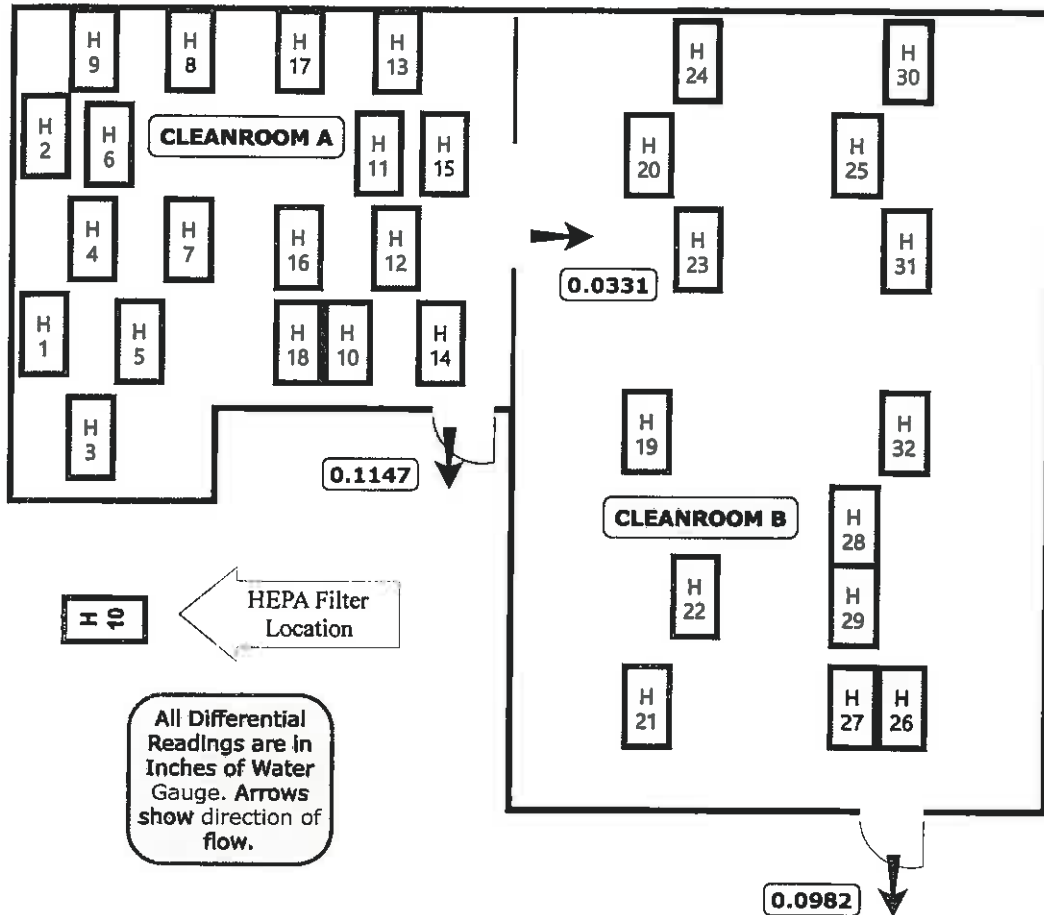
Initials BE Date 05 JAN 2021

**CLEANROOM B AIRBORNE PARTICLE COUNT DATA**

<b>SAMPLE LOCATION (ISO Class 5)</b>	<b>0.5 MICRONS (Limit 3,520)</b>	<b>5.0 MICRONS (Limit N/A)</b>
1	179	36
2	321	36
3	0	0
4	179	0
5	286	0
6	0	0
7	0	0
8	36	0
9	0	0
10	0	0
11	36	0
12	36	36
<b>AVERAGE COUNT</b>	<b>89.3</b>	<b>8.9</b>
<b>STANDARD DEVIATION</b>	<b>119.4</b>	<b>16.1</b>
<b>STANDARD ERROR</b>	<b>34.5</b>	<b>4.7</b>

Initials BE Date 05 JAN 2021

### CLEANROOM A & B HEPA FILTER LOCATION DIAGRAM



**CLEANROOM A VELOCITY COUNT DATA**

<b>HEPA FILTER #</b>	<b>VELOCITY #1</b>	<b>VELOCITY #2</b>	<b>AVERAGE VELOCITY</b>
1	78	86	82
2	73	89	81
3	91	120	106
4	90	111	101
5	121	126	124
6	110	119	115
7	128	134	131
8	116	97	107
9	120	93	107
10	99	115	107
11	115	132	124
12	136	127	132
13	129	108	119
14	141	133	137
15	128	122	125
16	0	0	0
17	132	116	124
18	109	114	112
<b>AVERAGE AIRFLOW VELOCITY (fpm)</b>			<b>107.2</b>
<b>STANDARD DEVIATION</b>			<b>30.9</b>
<b>TOTAL AIR SUPPLIED (cfm)</b>			<b>13,310.1</b>
<b>APPROXIMATE ROOM VOLUME</b>			<b>3,740</b>
<b>THEORETICAL AIR CHANGES PER HOUR</b>			<b>213.5</b>

Initials BE Date 05 JAN 2021



**Room Temperature and Humidity Test**

\* Average Room Temperature = 71.1°F  
\* Average Room Humidity = 39.5%

<b>CLEANROOM A CERTIFICATE OF COMPLIANCE</b>	
<b>Test Mode:</b>	Operational
<b>Airflow Type:</b>	Non-Unidirectional
<b>Test Date:</b>	12/21/2020
<b>Next Test Date:</b>	12/2021
<b>Class:</b>	
ISO 14644-1: 5	Limit at 0.5 µm = 3,520
CLEANROOM A Meets the Requirements Per ISO 14644-1 Class 5, at 0.5 µm Particle Size.	

Initials BE Date 05 JAN 2021

**CLEANROOM B VELOCITY COUNT DATA**

<b>HEPA FILTER #</b>	<b>VELOCITY #1</b>	<b>VELOCITY #2</b>	<b>AVERAGE VELOCITY</b>
19	136	118	127
20	127	109	118
21	133	142	138
22	125	134	130
23	119	106	113
24	112	101	107
25	104	115	110
26	122	129	126
27	138	126	132
28	111	123	117
29	167	148	158
30	88	99	94
31	125	131	128
32	122	136	129
<b>AVERAGE AIRFLOW VELOCITY (fpm)</b>			<b>123.1</b>
<b>STANDARD DEVIATION</b>			<b>15.4</b>
<b>TOTAL AIR SUPPLIED (cfm)</b>			<b>11,888.7</b>
<b>APPROXIMATE ROOM VOLUME</b>			<b>5,355</b>
<b>THEORETICAL AIR CHANGES PER HOUR</b>			<b>133.2</b>

Initials BE Date 05 JAN 2021

**Room Temperature and Humidity Test**

\* Average Room Temperature = 70.9°F  
\* Average Room Humidity = 38.4%

<b>CLEANROOM B CERTIFICATE OF COMPLIANCE</b>	
<b>Test Mode:</b>	Operational
<b>Airflow Type:</b>	Non-Unidirectional
<b>Test Date:</b>	12/21/2020
<b>Next Test Date:</b>	12/2021
<b>Class:</b>	
ISO 14644-1: 5	Limit at 0.5 $\mu\text{m}$ = 3,520
CLEANROOM B <b>Meet</b> the Requirements Per ISO 14644-1 Class 5, at 0.5 $\mu\text{m}$ Particle Size.	

Initials BE Date 05 JAN 2021



## Certificate of Calibration

Beckman Coulter certifies that the calibration performed complies with the requirements of ISO 21501-4:2018(E) standard, as requested by the customer. The reported As-Calibrated uncertainties with a confidence level of 95% are  $\pm 5.8\%$  related to size accuracy,  $\pm 2.4\%$  related to flow rate,  $\pm 2.8\%$  related to size resolution,  $\pm 7.4\%$  related to 50% counting efficiency and  $\pm 5.8\%$  related to 100% counting efficiency, respectively.

The accuracy of the standards and equipment used for the calibration are traceable to the US National Institute of Standards and Technology (NIST). A record of all work performed is maintained by Beckman Coulter, an ISO 9001 certified company. This certificate may not be reproduced other than in full. Calibration certificates without a watermark and an authorized signature are not valid.

### General Information

#### Manufacturer

Beckman Coulter  
Building 4  
No. 218 Sanglian Street, Suzhou Industrial Park  
China

#### Lab Contact Information

Huangfy Zhenzhen  
Technician

### Instrument Information

<u>Counter Model</u>	3413+	<u>Calibration Date</u>	2020-08-13	<u>Temperature</u>	24.0°C
<u>Part Number</u>	C36094	<u>Calibration Due</u>	2021-08-13	<u>Relative Humidity</u>	70.0%
<u>Counter Serial</u>	C38675-2020330012	<u>RA Number</u>		<u>Pressure</u>	100.6kPa
<u>Sensor Serial</u>	08132020V115			<u>Nominal Flow</u>	28.3L/min
<u>Procedure</u>	DMR-00106			<u>Initial Laser Current</u>	77.0mA @ 24.0°C
				<u>Laser Current (Reference Only)</u>	77.0mA

### Performance Information

<u>Test Name</u>	<u>Test Result</u>	<u>Criteria</u>	<u>Pass/Fail</u>
ISO-21501-4 Flow	28.4L/min	$\pm 5\%$	Pass
Noise	15mV	Reference Only	N/A
Peak to Valley	3.2:1	N/A	N/A
ISO-21501-4 Resolution (@ 0.508 $\mu$ m)	3.07%	$\leq 15\%$	Pass
ISO-21501-4 50% Counting Efficiency (D)	58.7%	50% $\pm$ 20%	Pass
ISO-21501-4 100% Counting Efficiency (D)	104.5%	100% $\pm$ 10%	Pass
ISO-21501-4 False Count Rate	0 counts in 0.42m <sup>3</sup>	1 counts in 0.14m <sup>3</sup>	Pass

This calibration fully complies with the requirements of ISO-21501-4:2018(E) Calibration

黄芬芬 2020-AUG-13



<u>Calibration Equipment</u>			
<u>Type</u>	<u>Model</u>	<u>Serial Number</u>	<u>Cal Due Date</u>
Counter Standard	3400-STD	1712531002	2020-09-08
Barometer	68000-49	192527605	2021-10-01
Thermometer	68000-49	192527605	2021-10-01
Flow Meter	4043	4043 1748 006	2021-03-10

<u>Calibration Information</u>							
<u>Channel</u>	<u>Size (µm)</u>	<u>Threshold (mV)</u>	<u>Calibrated (mV)</u>	<u>PSL Size (µm)</u>	<u>Mfr</u>	<u>Lot Number</u>	<u>Expiration</u>
1	0.3	52.65	54.17	0.303	Duke by Thermo	196947	2021-04-30
2	0.5	229.72	237.50	0.508	Duke by Thermo	193188	2021-01-31
3	1.0	536.66	554.12	1.030	Duke by Thermo	192847	2021-01-31
4	3.0	1493.46	1491.78	3.007	Duke by Thermo	194205	2021-02-28
5	5.0	1038.82	1038.82	5.000	Duke by Thermo	214115	2022-07-31
6	10.0	3541.56	3541.56	10.000	Duke by Thermo	212455	2022-05-31

## CALIBRATION CERTIFICATE

**Instrument** HMP110  
**Order code** B12C1C3B0  
**Serial Number** S3320270  
**Manufacturer** Vaisala Oyj, Finland  
**Calibration date** 11th August 2020

The above instrument was calibrated by comparing the readings to factory working standards.

The measurement results are traceable to the international system of units (SI) through national metrology institutes (NIST USA, MIKES Finland, or equivalent) or via ISO/IEC 17025 accredited calibration laboratories.

### Analog output channel 1 calibration results

Output forced to V	Observed output V	Difference V	Permissible difference V
2.500	2.500	0.000	±0.005

### Analog output channel 2 calibration results

Output forced to V	Observed output V	Difference V	Permissible difference V
2.500	2.500	0.000	±0.005

### Humidity calibration results

Reference humidity %RH	Observed humidity %RH	Humidity difference %RH	Reference temperature °C	Reference dewpoint °C	Observed dewpoint °C	Permissible difference %RH
91.56	92.35	0.79				±1.5
50.37	50.50	0.13	21.95	11.17	11.20	±1.5
0.34	0.36	0.02				±1.5

### Temperature calibration results

Observed probe temperature °C	Reference temperature °C	Temperature difference °C	Permissible difference °C
21.93	21.95	-0.02	±0.1

### Equipment used in calibration

Type	Serial number	Calibration date	Certificate number
HMT330 / U	G0810116	2020-5-18	H55-20210022
HMT337	G0810116	2019-08-21	K008-C02788
HMT337 / U	G0810108	2020-5-18	H55-20210023
HMT337	G0810108	2019-08-21	K008-C02789
E3632A	MY40017096	2018-10-25	1250-307097715
AT 34970A	MY41010487	2019-10-01	1250-307106142

### Uncertainties (95 % confidence level, k=2)

Humidity ±1.1 %RH @ 0...90 %RH  
 Humidity ±1.8 %RH @ 90...100 %RH  
 Temperature ±0.20 °C

Ambient conditions / Humidity 38 ±5 %RH, Temperature 23 ±1 °C, Pressure 1021 ±1 hPa.



Technician



# CERTIFICATE OF CALIBRATION

TSI Incorporated, Alnor Products, 500 Cardigan Road, Shoreview, MN 55126 USA  
 TEL: 1-800-874-2811 1-651-490-2811 FAX: 1-651-490-3824 www.alnor.com

ENVIRONMENT CONDITION		
TEMPERATURE	72.9	°F
RELATIVE HUMIDITY	45.4	% RH
BAROMETRIC PRESSURE	29.04	inHg

MODEL	EBT™ Micromanometer EBT730
SERIAL NO.	EBT732033006

CALIBRATION STANDARDS USED	
Manometer Calibration Bench I	

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

CALIBRATION DATA						
TESTING POINTS	BAROMETRIC PRESSURE MEASURED IN in.Hg			DIFFERENTIAL PRESSURE MEASURED IN in.H <sub>2</sub> O		
	CALIBRATION STANDARD	INSTRUMENT OUTPUT	ALLOWABLE RANGE	CALIBRATION STANDARD	INSTRUMENT OUTPUT	ALLOWABLE RANGE
1	20.39	20.37	19.99 - 20.79	0.1072	0.1065	0.1050 - 0.1094
2	29.04	29.04	28.46 - 29.62	0.503	0.503	0.493 - 0.513
3	34.28	34.27	33.60 - 34.96	3.01	3.02	2.95 - 3.07
4	-	-	-	11.5	11.5	11.3 - 11.7
5	-	-	-	14.9	14.9	14.6 - 15.2

TESTING POINTS	TEMPERATURE MEASURED IN °F <sup>1</sup>		
	CALIBRATION STANDARD	INSTRUMENT OUTPUT	ALLOWABLE RANGE
1	5.0	5.0	4.5 - 5.5
2	77.0	77.0	76.5 - 77.5
3	158.0	157.9	157.5 - 158.5

\* Indicates out of tolerance condition

<sup>1</sup>Circuit portion of temperature measurement only, not including probe

TSI Incorporated does hereby certify that the above described instrument conforms to the original manufacturer's specifications (not applicable to As Found data) and has been calibrated using standards whose accuracies are traceable to 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. The following ratios express the expanded uncertainty at a confidence level of 95% (i.e. with a coverage factor k=2) of the calibration facilities with respect to the instrument being calibrated: for barometric pressure ≥ 6.7:1; for differential pressure ≥ 3:1; for temperature ≥ 1.16:1. TSI is registered to ISO-9001:2015, Quality Assurance Requirements. This report may not be reproduced, except in full, unless permission for the publication of an approved abstract is obtained in writing from the calibration organization issuing this report.

Measurement Variable	System ID Number	Date Last Calibrated	Calibration Due Date
DC Voltage	E002798	08-16-19	02-28-21
DC Voltage	E002797	08-16-19	02-28-21
Pressure	E002124	09-05-19	09-30-20
Pressure	E002447	05-20-20	05-31-21

Calibration procedure used: 10000022697

*Hoe. Ken Manita*  
 \_\_\_\_\_  
 Calibrated By

Aug. 12, 2020

\_\_\_\_\_  
 Calibration Date

1083501A



# CERTIFICATE OF CALIBRATION

TSI Incorporated, Alnor Products, 500 Cardigan Road, Shoreview, MN 55126 USA  
TEL: 1-800-874-2811 1-651-490-2811 FAX: 1-651-490-3824 www.alnor.com

ENVIRONMENT CONDITION		
TEMPERATURE	22.7	°C
RELATIVE HUMIDITY	45.4	% RH
BAROMETRIC PRESSURE	983	hPa

MODEL	EBT™ Micromanometer EBT730
SERIAL NO.	EBT732033006

CALIBRATION STANDARDS USED
Manometer Calibration Bench I

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

CALIBRATION DATA						
TESTING POINTS	BAROMETRIC PRESSURE MEASURED IN hPa			DIFFERENTIAL PRESSURE MEASURED IN Pa		
	CALIBRATION STANDARD	INSTRUMENT OUTPUT	ALLOWABLE RANGE	CALIBRATION STANDARD	INSTRUMENT OUTPUT	ALLOWABLE RANGE
1	690	690	676 - 704	26.70	26.53	26.14 - 27.26
2	983	983	963 - 1003	125	125	122 - 128
3	1161	1161	1138 - 1184	750	752	735 - 765
4	-	-	-	2865	2865	2808 - 2922
5	-	-	-	3711	3711	3637 - 3785

TESTING POINTS	TEMPERATURE MEASURED IN °C <sup>1</sup>		
	CALIBRATION STANDARD	INSTRUMENT OUTPUT	ALLOWABLE RANGE
1	-15.0	-15.0	-14.7 - -15.3
2	25.0	25.0	24.7 - 25.3
3	70.0	69.9	69.7 - 70.3

\* Indicates out of tolerance condition

<sup>1</sup>Circuit portion of temperature measurement only, not including probe

TSI Incorporated does hereby certify that the above described instrument conforms to the original manufacturer's specifications (not applicable to As Found data) and has been calibrated using standards whose accuracies are traceable to 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. The following ratios express the expanded uncertainty at a confidence level of 95% (i.e. with a coverage factor k=2) of the calibration facilities with respect to the instrument being calibrated: for barometric pressure ≥ 6.7:1; for differential pressure ≥ 3:1; for temperature ≥ 1.16:1. TSI is registered to ISO-9001:2015, Quality Assurance Requirements. This report may not be reproduced, except in full, unless permission for the publication of an approved abstract is obtained in writing from the calibration organization issuing this report.

Measurement Variable	System ID Number	Date Last Calibrated	Calibration Due Date
DC Voltage	E002798	08-16-19	02-28-21
DC Voltage	E002797	08-16-19	02-28-21
Pressure	E002124	09-05-19	09-30-20
Pressure	E002447	05-20-20	05-31-21

Calibration procedure used: 1000022697

*Handwritten signature*

Calibrated By

Aug. 12, 2020

Calibration Date

1083501A

TSI PN 2300157