VAISALA Certificate of Calibration

Certificate #:	210212-PTU307-J1620009
Calibration Date:	February 12, 2021
Type:	Vaisala Pressure, RH & Temp. Transmitter
Model #:	PTU307
Serial #:	J1620009
Case #:	183319

Customer:
University of Alaska
Marine Science Bldg Room G
1501 NE Boat Street
Seattle, WA 98195

Condition: The instrument was operational upon receipt.

Action Taken: The sensor and filter were replaced. The instrument was adjusted and calibrated.

Due Date: * February 12, 2022

RH, P Calibrated By:

Roun Roeun
Calibration Technician

Approved By:

The measurement results on the certificate are traceable to the SI via NIST or another National Metrology Institute. This certificate may only be reproduced in full, except with the prior approval of the laboratory. Vaisala is ISO 9001:2015 certified. Vaisala's calibration system complies with ANSI/NCSL Z540-1-1994.

Special Limitations: None.

*Any due date given is based on a customer provided calibration interval. A number of factors may cause drift prior to the due date. Monitor all devices and calibrate when measurement error is suspected.

Certificate printed February 12, 2021.

Vaisala Inc. | Boston Office
10-D Gill Street, Woburn, MA 01801, USA
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www.vaisala.com

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Relative Humidity Calibration

Procedure #: PI216167 Rev. E
Instrument Range: 0 to 100 %rh
Lab Environment: Relative Humidity 37.6 %rh, Temperature 22.0 °C

As Found Results

Relative Humidity					
Reference [%rh]	Reading [%rh]	Error [%rh]	Uncertainty [%rh]	Specification [%rh]	Note(s)
15.10	15.21	0.11	±0.42	±1.00	-
33.10	33.57	0.47	±0.60	±1.00	-
53.90	54.66	0.76	±0.83	±1.00	-
75.12	75.36	0.24	±0.79	±1.00	-
Temperature					
Reference [°C]	Reading [°C]	Error [°C]	Uncertainty [°C]	Specification [°C]	Note(s)
22.02	22.03	0.01	±0.13	±0.21	-

Any error greater than the specification is noted with *

As Left Results

Relative Humidity					
Reference [%rh]	Reading [%rh]	Error [%rh]	Uncertainty [%rh]	Acceptance Limit [%rh]	Pass/Fail
15.10	15.19	0.09	±0.42	±1.00	PASS
33.11	33.15	0.04	±0.60	±1.00	PASS
53.99	54.28	0.29	±0.78	±1.00	PASS
75.10	75.55	0.45	±0.79	±1.00	PASS
Temperature					
Reference [°C]	Reading [°C]	Error [°C]	Uncertainty [°C]	Acceptance Limit [°C]	Pass/Fail
22.04	22.05	0.01	±0.13	±0.21	PASS

Pass: Error within or equal to Acceptance Limit, Fail: Error outside Acceptance Limit

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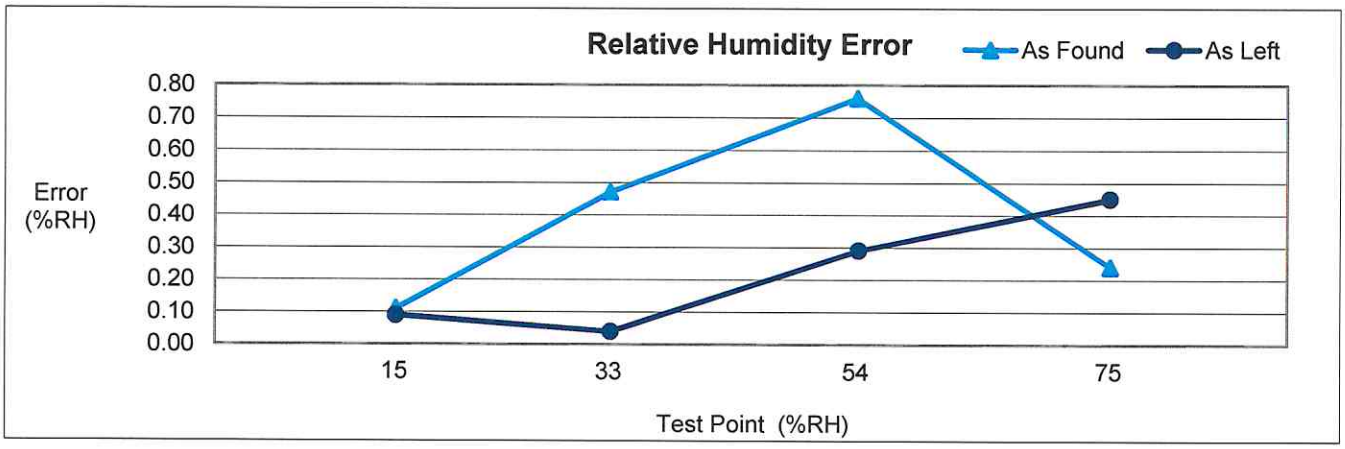
Relative Humidity Calibration



Reference Standards Calibration Information				
Model	**Serial Number**	**Asset Number**	**Calibration**	**Due Date**
Thunder Scientific 2500	0803674	5011-0043	Aug. 28, 2020	Feb. 28, 2021
Fluke 8845A	4869037	20128	Feb. 03, 2020	Feb. 28, 2021

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Pressure Calibration

Procedure #: PI215589 Rev. B
Instrument Range: 500 to 1100 hPa
Lab Environment: Relative Humidity 38.4 %rh, Temperature 22.0 °C

As Found Data

Pressure					
Reference [hPa]	Reading [hPa]	Error [hPa]	Uncertainty [hPa]	Specification [hPa]	Note(s)
500.02	500.12	0.10	±0.07	±0.14	-
550.01	550.11	0.10	±0.07	±0.14	-
650.01	650.09	0.08	±0.07	±0.14	-
750.01	750.09	0.08	±0.07	±0.14	-
850.03	850.09	0.06	±0.07	±0.14	-
950.00	950.05	0.05	±0.07	±0.14	-
1000.01	1000.05	0.04	±0.07	±0.14	-
1050.00	1050.04	0.04	±0.07	±0.14	-
1100.02	1100.05	0.03	±0.07	±0.14	-

Any error greater than the specification is noted with *

As Left Data

Pressure					
Reference [hPa]	Reading [hPa]	Error [hPa]	Uncertainty [hPa]	Acceptance Limit [hPa]	Pass/Fail
500.00	499.99	-0.01	±0.07	±0.05	PASS
550.00	549.99	-0.01	±0.07	±0.05	PASS
650.00	649.99	-0.01	±0.07	±0.05	PASS
749.99	749.97	-0.02	±0.07	±0.05	PASS
849.99	849.97	-0.02	±0.07	±0.05	PASS
949.99	949.98	-0.01	±0.07	±0.05	PASS
999.99	999.97	-0.02	±0.07	±0.05	PASS
1049.98	1049.97	-0.01	±0.07	±0.05	PASS
1099.99	1099.98	-0.01	±0.07	±0.05	PASS

Pass: Error within or equal to Acceptance Limit, Fail: Error outside Acceptance Limit

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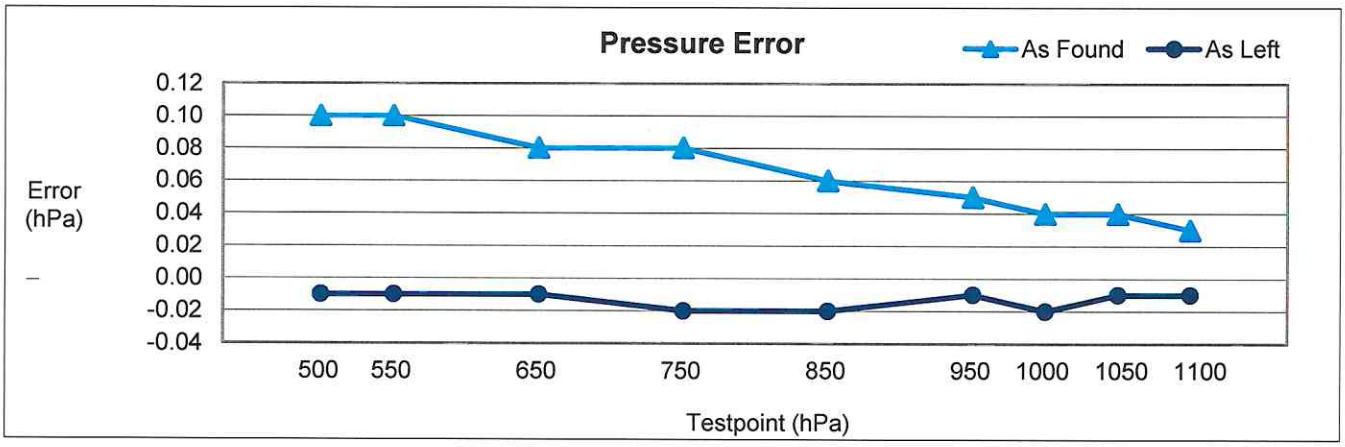
Pressure Calibration



Reference Standards and Measurement Equipment				
Model	**Serial Number**	**Asset Number**	**Calibration**	**Due Date**
Fluke PPC4 A100Kp	440	PA-13452	Dec. 18, 2020	Sep. 30, 2021
Vaisala Shunt Resistor	N/A	ES-12800	Apr. 30, 2020	Apr. 30, 2021
Agilent 34970A	MY44019479	EM-12795	Sep. 03, 2020	Sep. 30, 2021

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Description

The calibration was performed in the Standard Laboratory of Vaisala, Inc. The instrument was first allowed to equilibrate to the laboratory environmental conditions for a period of at least 8 hours. The calibration laboratory is controlled at 22 °C ± 3 °C and 40 %rh ± 20 %rh.

Relative Humidity Calibration: The sensor of the instrument was placed in the chamber of a Thunder Scientific 2500. The instrument was allowed to stabilize at each testpoint.

Chemical Purge: If the instrument has the chemical purge option, the purge function was run before As Found data was collected.

Pressure Calibration: The instrument was allowed to warm up for at least 2 hours before the calibration. The instrument's input port was connected to the output of a Fluke PPC4 Pressure Controller/Calibrator and the connection was tested for leaks. The testpoints are measured from high to low then again from low to high. The instruments were allowed to stabilize for at least 2 minutes after each testpoint was reached. The reported readings are the average of the readings from the high to low cycle and the readings from the low to high cycle.

References

The Thunder Scientific 2500 Two-Pressure Humidity Generator saturates a continuous stream of air with water vapor at a controlled pressure and temperature. The saturated high-pressure air then passes through an expansion valve to generate a specific humidity at the chamber pressure and temperature.

The Fluke PPC4 Pressure Controller/Calibrator digitally controls the pneumatic pressure output using solenoid valves and differential pressure regulators. It measures the pressure with a quartz reference pressure transducter (Q-RPT).

Statement of Conformity Decision Rule

The statement of conformity is based on simple acceptance, whether the calibration result is within or outside the manufacturer's specification/acceptance limits. The calibration uncertainty is not taken into account in the statement of conformity. The probability of accepting a non-conforming result or rejecting a conforming result can be as large as 50% with this acceptance rule when the calibration result is close to the acceptance limit.

Uncertainty

The reported expanded uncertainty of the measurement is stated as the standard uncertainty of the measurement multiplied by the coverage factor of k=2, which corresponds to a coverage probability of approximately 95%. The standard uncertainty of the measurement has been determined in accordance with the ISO Guide to the Expression of Uncertainty in Measurement.

The calibration uncertainty represents the situation at the time and conditions of calibration. When using the instrument at different conditions and at a different time the conditions and stability of the instrument shall be evaluated separately. The calibration results and the statement of conformity of specification/acceptance limit relate only to the calibrated instrument and the calibration points.

DOC228428 Rev. J