CERTIFICATE OF CALIBRATION

Customer: INGOBAR METROLOGIA
CARRERA 38A # 25B - 15
BARRIO EL RECUERDO
BOGOTA,
PO Number: OGC-IM-2023-174

ANAB ANSI National Accreditation Board ACCREDITED ISO/IEC 17025 CALIBRATION AND DIMENSIONAL MEASUREMENT
ANAB AC-2489.06

Certificate/SO Number: 15-E7T3O-20-1 Revision 0

Manufacturer: Hart Scientific/Fluke
Model Number: 1502A (AccuMac AM1751)
Description: Digital Thermometer, w/RTD Probe
Serial Number: B3B488/1622038
ID: NONE

As-Found: Out Of Tolerance
As-Left: In Tolerance

Issue Date: Dec 18, 2023
Calibration Date: Dec 15, 2023
Due Date: Dec 15, 2024

Calibrated To: Manufacturer Specification
Calibration Procedure: 1-AC92509-2

Transcat Calibration Laboratories have been audited and found in compliance with ISO/IEC 17025:2017. Accredited calibrations performed within the Lab Scope of Accreditation are indicated by the presence of the Accrediting Body Logo and Certificate Number. Any measurements on an accredited calibration not covered by the Lab Scope of Accreditation are listed in the notes section of the certificate. SCC, NRC, CLAS or ANAB do not guarantee the accuracy of an individual calibration by accredited laboratories.

Transcat calibrations, as applicable, are performed in compliance with the requirements of the Transcat Quality Manual QAC-P01-000, the customer Purchase Order and/or Quality Agreement requirements, ISO 9001:2015, ANSI/NCSL Z540.1-1994 (R2002), and ISO 10012:2003, as applicable. When specified contractually, the requirements of ISO TS16949:2009, 10CFR21, 10CFR50 App. B, ASME NQA-1:2012, and ANSI/NCSL Z540.3-2006 (R2013) are also covered.

Complete records of work performed are maintained by Transcat and are available for inspection. Laboratory standards used in the performance of this calibration are listed on this certificate.

Transcat documents the traceability of measurements to the SI units through the National Institute of Standards and Technology (NIST), or the National Research Council of Canada (NRC), or other national measurement institutes (NMI) that are signatories to the CIPM Mutual Recognition Arrangement, or accepted fundamental and/or natural physical constants, or by the use of specified methods, consensus standards or ratio type measurements. Documentation supporting traceability information is available for review upon written request at a Transcat facility. The measured quantity and the measurement uncertainty are required for further dissemination of traceability.

Uncertainties are reported with a coverage factor k=2, providing a level of confidence of approximately 95%. All calibrations have been performed using processes having a TUR of 4:1 or better (3:1 for mass calibrations), unless otherwise noted. The Test Uncertainty Ratio (TUR) is calculated in accordance with NCSL International RP-18. For mass calibrations: Conventional mass referenced to 8.0 g/cm³.

The results in this report relate only to the item calibrated or tested. Recorded calibration data is valid at the time of calibration within the stated uncertainties at the environmental conditions noted. The determination of compliance to the specification is specific to the model/serial no./ID no. referenced above based on the tolerances shown; these tolerances are either the original equipment manufacturers (OEM's) warranted specifications or the client's requested specifications. Any number of factors can cause a unit to drift out of tolerance at any time following its calibration. Limitations on the uses of this instrument are detailed in the OEM's operating instructions. This certificate may not be reproduced except in full, without the written approval of Transcat. Additional information, if applicable may be included on separate report(s).

Notes:

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As-Left
ITS-90 Coefficients:
RTPW = 100.0110
a4 = -3.730827 E-04
b4 = 3.557229 E-05
a7 = -4.883016 E-04
b7 = 1.262002 E-05
c7 = -1.429372 E-05
Meter Calibration Constants:
C0 = 0.0000
C100 = 0.0000
C400 = 0.0000
Unit was received out of tolerance, verified and new coefficients calculated to meet manufacturer's specifications.

As-Found
ITS-90 Coefficients:
RTPW = 100.0040
a4 = -5.040285 E-04
b4 = -5.956584 E-05
a7 = -3.936246 E-04
b7 = -3.072231 E-05
c7 = 3.322664 E-06
Meter Calibration Constants:
C0 = 0.0000
C100 = 0.0000
C400 = 0.0000 The OOT readings were verified.

As Found Data

Description	Setpoints	Accuracy	Low Limit	High Limit	As Found	OOT	Cal Process Uncertainty (k=2; ±)	Measurement Uncertainty (k=2; ±)	Units	TUR

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As Found Data

Description	Setpoints	Accuracy	Low Limit	High Limit	As Found	OOT	Cal Process Uncertainty (k=2; ±)	Measurement Uncertainty (k=2; ±)	Units	TUR
Temperature										
AR Tp	-195.7362°C	±(0.025 °C)	-195.761	-195.711	-195.728 °C		2.5e-003	2.6e-003	°C	10.0 : 1
Hg TP	-38.8354°C	±(0.016 °C)	-38.851	-38.819	-38.824 °C		1.4e-003	1.5e-003	°C	11.4 : 1
TPW	0.0100°C	±(0.013 °C)	-0.003	0.023	0.025 °C	*	6.0e-004	8.3e-004	°C	21.7 : 1
Sn FP	231.9280°C	±(0.028 °C)	231.900	231.956	231.943 °C		2.1e-003	2.2e-003	°C	13.3 : 1
Zn FP	419.5270°C	±(0.040 °C)	419.487	419.567	419.542 °C		3.5e-003	3.5e-003	°C	11.4 : 1
Al FP	660.3230°C	±(0.048 °C)	660.275	660.371	660.333 °C		8.6e-003	8.6e-003	°C	5.6 : 1

As Left Data

Description	Setpoints	Accuracy	Low Limit	High Limit	As Left	OOT	Cal Process Uncertainty (k=2; ±)	Measurement Uncertainty (k=2; ±)	Units	TUR
Temperature										
AR Tp	-195.8181°C	±(0.025 °C)	-195.843	-195.793	-195.816 °C		2.5e-003	2.6e-003	°C	10.0 : 1
Hg TP	-38.8365°C	±(0.016 °C)	-38.853	-38.821	-38.831 °C		1.4e-003	1.5e-003	°C	11.4 : 1
TPW	0.0100°C	±(0.013 °C)	-0.003	0.023	0.012 °C		6.0e-004	8.3e-004	°C	21.7 : 1
Sn FP	231.9280°C	±(0.028 °C)	231.900	231.956	231.928 °C		2.1e-003	2.2e-003	°C	13.3 : 1
Zn FP	419.5270°C	±(0.040 °C)	419.487	419.567	419.526 °C		3.5e-003	3.5e-003	°C	11.4 : 1
Al FP	660.3230°C	±(0.048 °C)	660.275	660.371	660.323 °C		8.6e-003	8.6e-003	°C	5.6 : 1

Field not applicable.

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Traceable Standards

Asset	Manufacturer	Model Number	Description	Cal Date	Due Date	Traceability Number	Use
31172	Hart Scientific	5915A	Fixed Point Cell - Sn	20-Nov-06	30-Nov-36	15-&31172-1-1	AF/AL
C252A	Hart Scientific	5916A	Freeze Point Cell - Zn	21-Sep-04	30-Sep-34	Lot#:L16N08	AF/AL
H1108	Guildline Instruments Inc.	9334A-100	Precision Resistor	12-Sep-23	31-Mar-24	CAL283112	AF/AL
M1970	Hart Scientific/Fluke	5947	Fixed Point Cell, Aluminum (Al)	25-Jan-21	31-Jan-51	Lot#:M53531-A	AF/AL
M2020	Hart Scientific/Fluke	5901B-G	Fixed Point Cell, Triple Point of Water	9-Jan-20	9-Jan-50	B-G3160/12-30-2019	AF/AL
M4500	Hart Scientific/Fluke	5699	SPRT	5-Sep-23	30-Sep-24	C3919038	AF/AL
M5000	Hart Scientific/Fluke	1590	Super-Thermometer II	3-Feb-23	29-Feb-24	CAL271613	AF/AL

The use of the standard is defined as: AF - used for as-found readings, AL - used for as-left readings.

Environmental Data

	Temperature	Relative Humidity	Temp / RH Asset	Lab Area	Lab Description
As Found:	68.60°F /20.33°C	31.40%	M1325	C	Primary Temperature
As Left:	68.00°F / 20.00°C	31.00%	M1325	C	Primary Temperature

Decision Rule

When compliance statements are present, they are reported without factoring in the effects of uncertainty and comply with the guidelines as follows: The acceptance zone is defined as: less than or equal to the high limit, and/or greater than or equal to the low limit. The rejection zones are defined as greater than the high limit and/or less than the low limit. Single measurement results in the acceptance zone are identified as in-tolerance. Single measurement results in the rejection zone are identified as out-of-tolerance (OOT). When all measurement results are in the acceptance zone for repeated measurements, for the same characteristic, the test is identified as in-tolerance. For repeated characteristic measurements, a single measurement result in the rejection zone, will cause the test to be identified as out-of-tolerance (OOT). Data rejection for cause, (outliers) is permitted after the â€œDetermining and Verifying Out Of Tolerance (OOT) and/or Op Fail Readingsâ€□ procedure outlined in this document has been completed and the anomalous reading cannot be repeated, and the anomalous reading does not represent the system under test. Statements of conformity are binary.

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Legend

Topic	Description
Accuracy	UUT specification that establishes expected tolerances and a time limit (calibration interval) over which the instrument is expected to hold these tolerances
As Found	Initial measurement results
As Left	Measurement results after adjustment and/or repair
Blank Data Field	Test is not applicable for the UUT
Cal Process Uncertainty (CPU)	The uncertainty of calibration process for the reported measurement result
Calibration Date	Indicates the date that the calibration was completed
Cover Factor (k)	A measure of uncertainty that defines an interval about the measurement result
Due Date	Indicates the end of the calibration cycle as requested by the customer
Issue Date	Indicates the date that the calibration has passed the Data Review Process and was signed by an authorized signatory or the date that a revision to the original certificate has been issued
Low / High Limits	Establishes UUT acceptable performance limits for the test measurement
Measurement Uncertainty	The dispersion of the values attributed to a measured quantity
OOA	Out of Acceptance (#)
OOT	Out of Tolerance (*)
Setpoints	Measurement target values
Traceability	Unbroken chain of comparisons relating an instrument's measurements to a known standard(s)
Traceability Number	Unique identifier(s) used to document traceability of calibration standards
TUR	Test Uncertainty Ratio, ratio of the tolerance or specification of the test measurement in relation to the uncertainty in measurement results
UUT	Unit Under test

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Calibrated At:
2056 S. Alex Road
West Carrollton, OH 45449

Facility Responsible:
2056 S. Alex Road
West Carrollton, OH 45449
800-828-1470

Calibrated By:
Electronically Signed By:
Marc Rhoades

Marc Rhoades	Dec 15, 2023
Calibration Technician	18:48:09 -05:00

Reviewed By:
Electronically Signed By:
Jason Fillback for

Derek Atkinson	Dec 18, 2023
Lab Manager	06:53:18 -05:00

Unit Barcode: 0900B321370

Date Received: December 13, 2023
Service Level : P9

Customer Number: 1-686749-000