

3695 N. 126th Street
Brookfield, WI 53005
Phone: 262-790-1916
www.callabco.com
@callabco.com



LABORATORY
ACCREDITATION
BUREAU
ACCREDITED ISO/IEC 17025
Certificate #L2218.01 Calibration



Calibration Certificate

(Level 3) Accredited Calibration with Measurement Uncertainty
928672



Customer

Intertek Testing Services (3283)
8431 Murphy Drive
Middleton, Wisconsin 53562
PO Number: VISA-EXP 04/13

Instrument Profile

Manufacturer: Omega
Model: HH501BJK
Asset ID #: 001223
Serial #: 100006
Description: Digital Thermometer

Calibration Information

Calibration Date: 02/21/2011
†Calibration Due Date: 02/21/2012
Ambient Conditions: 74.8 °F (23.8 °C) / 26.7% RH
Technician: Jeremiah Popp
Calibration Location: Wisconsin Lab
Calibration Procedure: CP0030

Condition

Physical Damage: No evidence of physical/cosmetic damaged noted during this calibration.
As Found: Fully operational and within tolerance
As Left: Calibrated to Manufacturers specifications and left within tolerance

Technician Remarks

Quality & Traceability Statement

The results reported herein apply only to the calibration of the item described above. All calibration standards used in this calibration are traceable to SI units through NIST or equivalent NMI (National Measurement Institute). Our Quality System is accredited to ISO/IEC 17025:2005 and ANSI/NCSL Z540-1:1994 via the Laboratory Accreditation Bureau. Details of the scope of our accreditation are available at www.L-A-B.com.

†Per the requirements of ISO-17025:2005, Cal Lab Co., Inc. does not make recommendations for recall therefore the listed Due Date is dictated by the owner of this equipment. Although the item calibrated meets the conditions or specifications at the time of the calibration, due to a number of factors the due date of the item calibrated does not imply continuing conformance during the calibration interval. The parameters of this calibration are directly or indirectly covered under our current scope of accreditation unless otherwise noted.

¹ For purposes of determining conformance with the listed specifications (tolerances), the observed value or a calculated value has been rounded to the nearest unit in the last right-hand digit used in expressing the specification limit, in accordance with the rounding method of ASTM Practice E 29, for Using Significant Digits in Test Data to Determine Conformance with Specifications.

² The reported expanded uncertainty of measurement is reported at a coverage factor of $k=2$, which for a normal distribution corresponds to a coverage of approximately 95%. The expanded measurement uncertainty calculation does include the resolution of the instrument calibrated, which in some cases, may be a dominate source of error, but does not include Type A contributors (repeatability/reproducibility studies) of the instrument calibrated unless specifically requested by the customer. The uncertainty values reflect the measurement processes uncertainty and may not reflect the measurement uncertainty listed on our scope of accreditation. The measurement uncertainty is not considered (i.e. measured value + Emu) when making statements of compliance to specification (i.e. In tolerance, OOT, Pass/Fail, etc.) unless requested by the customer.

J. Brent Snoddy
Metrology Manager Review & Approval
quality@callabco.com

Calibration Certificate # 928672

(continued from previous page)

Calibration Standard(s)

ID	Manufacturer	Model	Description	Due Date	Expiry Date
1002-1507	Fluke	5520A-SC1100	Calibrator, Multi-Function, 1.1 GHz	01/31/2012	907803
1002-2237	China	HTC-1	Thermohygrometer	08/31/2011	895798

Calibration Data with Estimated Measurement Uncertainty [EMU]²

Function/Attribute	Nominal Value	As Found	As Found	As Found	As Found	Tolerance
T1 Type K	-100 °C	-100		-100		-101 to -99 °C [EMU 0.61 °C]
T1 Type K	0.0 °C	0.1		0.1		-1.0 to 1.0 °C [EMU 0.19 °C]
T1 Type K	32.0 °F	32.0		32.0		30.0 to 34.0 °F [EMU 0.34 °F]
T1 Type K	100.0 °C K tc	100.2		100.2		98.9 to 101.1 °C [EMU 0.19 °C]
T1 Type K	500 °C	500		500		498 to 502 °C [EMU 0.65 °C]
T1 Type K	1000 °C	1000		1000		998 to 1002 °C [EMU 0.65 °C]
T1 Type K	1300 °C	1300		1300		1298 to 1302 °C [EMU 0.74 °C]
T1 Type J	0.0 °C	0.9		0.9		-1.0 to 1.0 °C [EMU 0.17 °C]
T1 Type J	32.0 °F	33.4		33.4		30.0 to 34.0 °F [EMU 0.30 °F]
T1 Type J	100.0 °C	100.8		100.8		98.9 to 101.1 °C [EMU 0.17 °C]
T1 Type J	500 °C	500		500		498 to 502 °C [EMU 0.61 °C]
T1 Type J	1000 °C	1001		1001		998 to 1002 °C [EMU 0.64 °C]
T2 Type K	-100 °C	-100		-100		-101 to -99 °C [EMU 0.61 °C]
T2 Type K	0.0 °C	-0.1		-0.1		-1.0 to 1.0 °C [EMU 0.19 °C]
T2 Type K	32.0 °F	31.8		31.8		30.0 to 34.0 °F [EMU 0.34 °F]
T2 Type K	100.0 °C	100.0		100.0		98.9 to 101.1 °C [EMU 0.19 °C]
T2 Type K	500 °C	500		500		498 to 502 °C [EMU 0.65 °C]
T2 Type K	1000 °C	999		999		998 to 1002 °C [EMU 0.65 °C]
T2 Type K	1300 °C	1299		1299		1298 to 1302 °C [EMU 0.74 °C]
T2 Type J	0.0 °C	0.1		0.1		-1.0 to 1.0 °C [EMU 0.17 °C]
T2 Type J	32.0 °F	32.1		32.1		30.0 to 34.0 °F [EMU 0.30 °F]
T2 Type J	100.0 °C	100.0		100.0		98.9 to 101.1 °C [EMU 0.17 °C]
T2 Type J	500 °C	500		500		498 to 502 °C [EMU 0.61 °C]
T2 Type J	1000 °C	1000		1000		998 to 1002 °C [EMU 0.64 °C]

Datasheet Rev. Date: 03/22/2011

Out of tolerance readings (OOT) are annotated with a ✕

End of Calibration Data

Intertek Testing Services NA Inc.

Middleton, Wisconsin

Calibration Date: 3/16/11 Next Calibration Due: 9/16/11 Page 1 of 2

Calibrated By: SS Reviewed By: 3/16/11

This sheet and the MU of Y sheet must be printed and handed in to the calibration administrator. See tabs below.

Use Procedures: MID-OE-LAB-005

Barometer: 29.01

Meter Number Inventory Number:

Run Number	Meter Initial	Barometric Pressure	Spirometer Temperature	Vapor Pressure of H ₂ O (Hg)	Meter Temperature	Meter Pressure	Measurement Inches	Spirometer Volume	Meter Final	Y
1	1829.520	29.01	74.3	0.8464	74.2		23.7500	1.0795	1830.520	1.0478
2		29.01	74.5	0.8515	0.0			0.0000		#DIV/0!
3		29.01	74.2	0.8448	74.9			0.0000		#DIV/0!
4		29.01	0.0	0.0000	0.0			0.0000		#DIV/0!
5		29.01	0.0	0.0000	0.0			0.0000		#DIV/0!
6		29.01	0.0	0.0000	0.0			0.0000		0.0000
								0.1799	99.221	0.0000
								0.4407	AVERAGE	#DIV/0!
									STDEV	#DIV/0!
									MU of Y	#DIV/0!

Inventory Number:

Run Number	Meter Initial	Barometric Pressure	Spirometer Temperature	Vapor Pressure of H ₂ O (Hg)	Meter Temperature	Meter Pressure	Measurement Inches	Spirometer Volume	Meter Final	Y
1	1829.520	29.01	74.3	0.8464	74.2		23.75	1.0795	1830.520	1.0478
2	1830.520	29.01	74.5	0.8515	74.2		22	1.0000	1831.5	0.9899
3	1831.5	29.01	74.2	0.8448	74.2		23.1250	1.0511	1832.530	0.9907
								1.0436	AVERAGE	1.0095
								0.0403	STDEV	0.03321
									MU of Y	0.06643

Inventory Number: 998

Run Number	Meter Initial	Barometric Pressure	Spirometer Temperature	Vapor Pressure of H ₂ O (Hg)	Meter Temperature	Meter Pressure	Measurement Inches	Spirometer Volume	Meter Final	Y
1		29.01	74.3	0.8464	0.0			0.0000	0.6368	0.0000
2		29.01	74.5	0.8515	0.0			0.0000	0.671	0.0000
3		29.01	74.2	0.8448	0.0			0.0000	0.739	0.0000
								0.0000	AVERAGE	0.0000
									STDEV	0.0000
									MU of Y	0.0011
									MU of Y	0.00246

Accuracy of reading measurement: +/- 1/32 inches
Accuracy of reading meter dial: +/- .0001 cu/ft.

0.739

Measurement Uncertainty is calculated using the following formula:

$$O.M.U. = k \sqrt{(A.D.)^2 + (S.D.)^2 + (R.M.U.)^2}$$

O.M.U. = Overall Measurement Uncertainty

A.D. = Average Deviation of the difference of all measured results compared to the reference value.

S.D. = Standard Deviation of the difference of all measured results compared to the reference value.

k = Confidence Factor (2 for 95% confidence)

R.M.U. = Standard Measurement Uncertainty of Reference Measurement Equipment. R.M.U. is

considered as the measurement uncertainty as stated on calibration certificates of equipment, or

the tolerance listed in the calibration standard of the test equipment.

G:\AI_Dapla\Calibrations\Procedures and Verifications\MID-OE-LAB-005 E&E Dry Gas Meters ()