



SOUTHWEST RESEARCH INSTITUTE®

6220 Culebra Road, P.O. Drawer 28510
Institute Quality Systems
Institute Calibration Laboratory
Phone: 210-522-5215 Fax 210-522-4834



Calibration Laboratory
Certificate #0972-01

Certificate of Calibration

Cost Center / Customer: DIV20 / DON BANNON

Mail Stop: B57

Manufacturer/Model: OMEGA / HH22

Description: THERMOCOUPLE THERMOMETER

Serial Number: T-94140

Asset Number: 001997

Procedure: DIGITAL THERMOMETERS/MODULES - 28 JAN 11

Work Order: 303102202

Date Issued: 6-Jul-2011

Date Calibrated: 6-Jul-2011

*** Date Due :** 6-Jan-2012

**** Results:** FOUND-LEFT

Temperature: 74.0 °F

Humidity: 40 %RH

Barometer: N/A

This certificate documents traceability to the National Institute of Standards and Technology (NIST) and the International System of Units (SI). The Laboratory quality system conforms to ISO/IEC 17025, 2005, ANSI/NCSL Z540-1-1994 and relevant requirements of the ISO 9000-2000 standard. This certificate shall not be reproduced, except in full, without the written approval of the Southwest Research Institute Calibration Laboratory. This certificate shall not be used to claim product endorsement by Southwest Research Institute, American Association for Laboratory Accreditation (A2LA) or any agency of the U. S. Government. Results of this calibration relate only to the instrument described above at the time of calibration and does not imply any long term stability of the instrument.

*Determined by the customer, does not imply the instrument will remain within tolerance as any number of factors may cause an out-of-tolerance condition before this date. **Data type found in this certificate or attached measurement report must be interpreted as: Found-left - adjustment and/or repair was not performed, As-found - data is before unit is adjusted and/or repaired, As-left - data is after adjusted and/or repaired was performed. The customer has sole responsibility for determination of in-/out-of-tolerance or compliance/noncompliance.

Measurement uncertainty calculated in accordance with the method described in the ISO "Guide to the Expression of Uncertainty in Measurement" (GUM), for a confidence level of approximately 95 percent using a coverage factor of $k=2$.

Remarks: None

Standards Used

<u>Asset #</u>	<u>Manufacturer</u>	<u>Model</u>	<u>Description</u>	<u>Cal Date</u>	<u>Due Date</u>
004164	FLUKE	5500A/SC	CALIBRATOR	19-May-2011	19-May-2012

Walt Hill

Laboratory Manager

Bob Trollinger

Metrology Technician

Southwest Research Institute
Calibration Laboratory
Measurement Report

Work Order:	303102202	Mfr:	Omega	Technician:	blt
Asset No:	001997	Model:	HH22	Type Data:	Found-left
Serial No:	T-94140	Type:	Thermocouple Thermometer	Cal Date:	6-Jul-11
Remarks:					

Function/Range	Test Point	TI Reading	Difference	± Limit	± Uncertainty	Result	% Limit	
T1 Type J	°F	°F	°F	°F	°F			
	-40	-39.9	0.1	1.0	0.35	Pass	10%	
	110	110.1	0.1	1.1	0.30	Pass	9%	
	525	525.6	0.6	1.5	0.30	Pass	39%	
	940	940.6	0.6	1.9	0.30	Pass	31%	
	1350	1350.1	0.1	2.4	0.37	Pass	4%	
	°C	°C	°C	°C	°C			
	-40	-39.9	0.1	0.6	0.20	Pass	16%	
	40	40.0	0.0	0.6	0.18	Pass	0%	
	275	275.3	0.3	0.9	0.21	Pass	34%	
	510	510.3	0.3	1.1	0.21	Pass	27%	
	750	750.1	0.1	1.4	0.21	Pass	7%	
	T1 Type K	°F	°F	°F	°F	°F		
		-40	-39.8	0.2	1.0	0.35	Pass	19%
		390	390.6	0.6	1.4	0.55	Pass	43%
1075		1075.9	0.9	2.1	0.55	Pass	43%	
1760		1761.0	1.0	2.8	0.55	Pass	36%	
2450		2450.9	0.9	3.5	0.84	Pass	26%	
°C		°C	°C	°C	°C			
-40		-39.8	0.2	0.6	0.24	Pass	31%	
210		210.4	0.4	0.8	0.32	Pass	49%	
575		575.8	0.8	1.2	0.32	Pass	68%	
940		940.7	0.7	1.5	0.32	Pass	45%	
1300		1300.8	0.8	1.9	0.48	Pass	42%	
Difference		°F	°F	°F	°F	°F		
		T1-T2	0.0	0.0	0.0	2.2	1.8	Pass
T1-T2		°C	°C	°C	°C	°C		
	T1-T2	0.0	0.0	0.0	1.2	1.0	Pass	0%
T2 Type J	°F	°F	°F	°F	°F			
	-40	-39.7	0.3	1.0	0.30	Pass	29%	
	110	110.1	0.1	1.1	0.30	Pass	9%	
	525	525.6	0.6	1.5	0.30	Pass	39%	
	940	940.6	0.6	1.9	0.30	Pass	31%	
	1350	1350.2	0.2	2.4	0.37	Pass	9%	

Southwest Research Institute
Calibration Laboratory
Measurement Report

Work Order:	303102202	Mfr:	Omega	Technician:	blt
Asset No:	001997	Model:	HH22	Type Data:	Found-left
Serial No:	T-94140	Type:	Thermocouple Thermometer	Cal Date:	6-Jul-11

Function/Range	Test Point	TI Reading	Difference	± Limit	± Uncertainty	Result	% Limit
T2 Type J (Cont.)	°C	°C	°C	°C	°C		
	-40	-39.7	0.3	0.6	0.20	Pass	47%
	40	40.1	0.1	0.6	0.18	Pass	16%
	275	275.3	0.3	0.9	0.21	Pass	34%
	510	510.3	0.3	1.1	0.21	Pass	27%
	750	749.8	-0.2	1.4	0.21	Pass	15%
T2 Type K	°F	°F	°F	°F	°F		
	-40	-39.7	0.3	1.0	0.35	Pass	29%
	390	390.6	0.6	1.4	0.55	Pass	43%
	1075	1075.8	0.8	2.1	0.55	Pass	39%
	1760	1761.0	1.0	2.8	0.55	Pass	36%
	2450	2450.9	0.9	3.5	0.8	Pass	26%
	°C	°C	°C	°C	°C		
	-40	-39.8	0.2	0.6	0.24	Pass	31%
	210	210.3	0.3	0.8	0.32	Pass	37%
	575	575.5	0.5	1.2	0.32	Pass	43%
	940	940.3	0.3	1.5	0.32	Pass	19%
	1300	1300.4	0.4	1.9	0.48	Pass	21%

END OF REPORT

Robert L Trollinger

From: Don Bannon [dbannon@cnwra.swri.edu]
Sent: Thursday, June 30, 2011 3:49 PM
To: robert.trollinger@swri.org
Subject: -40 C temperature change

Bob—

Regarding the instrument of concern, please update the lowest temperature to be calibrated at -40 C.

The temp. range above -40 C will remain unchanged.

Thank you,
--Don

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