



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

Submitted By: DIV20

Address: B57

Contact: DON BANNON

Manufacturer / Model: OMEGA / HH22

Description: THERMOCOUPLE THERMOMETER

Serial No: T-94140

Asset No: 001997

Procedure: DIGITAL THERMOMETERS - 29 AUG 07

Work Order: 303077010

Date Issued: Oct 17, 2007

Calibration Date: Oct 17, 2007

***Calibration Due:** Apr 17, 2008

Calibration Location: Bldg. 64

Environment: Temp. 72.0°F Hum. 45 %RH

****Data Type:** FOUND-LEFT

DivID/Location: 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. **Found/Left = adjustment and/or repair was not required, As Left = adjusted and/or repaired was required. The client has sole responsibility for determination of in-/out-of-tolerance or compliance/noncompliance. See Remarks or attached Measurement Report with the same Work Order number for data.

Reported uncertainty calculated in accordance with the ISO "Guide to the Expression of Uncertainty in Measurement" (GUM) and represents an expanded uncertainty with a coverage factor of k=2 to approximate a 95% confidence level.

Remarks: None

Standards Used

| Asset No. | Serial No. | Manufacturer | Model | Description | Cal Due |
|-----------|------------|--------------|-------------|-------------|------------|
| 004164 | 6380025 | FLUKE | 5500A/SC300 | CALIBRATOR | Aug 24, 08 |

Reviewed by: () wgh () srk () jrg () blt () pwc
Metrology Technician

m:\a2la1.rpt Rev date August 15, 2005

Measurements by: Joe Greagrey
Metrology Technician

Southwest Research Institute
Calibration Laboratory
Measurement Report

| | | | | | |
|------------|-----------|-------|---------------------|------------|-----------|
| Work Order | 303077010 | Mfr. | OMEGA | Technician | JRG |
| Asset No. | 001997 | Model | HH22 | | |
| Serial No. | T-94140 | Type | Digital Thermometer | Cal Date | 17-Oct-07 |
| Remarks: | | | | | |

| Function/Range | Test Point | T1 Reading | Difference | +/-Limit | +/-Uncertainty | Found/Left |
|-------------------|------------|------------|------------|----------|----------------|------------|
| T1 Input | °F | °F | °F | °F | °F | Result |
| Type J | -300 | -301.2 | 1.2 | 1.3 | 0.57 | Pass |
| | 110 | 109.5 | 0.5 | 1.1 | 0.31 | Pass |
| | 525 | 525.1 | 0.1 | 1.5 | 0.37 | Pass |
| | 940 | 940.4 | 0.4 | 1.9 | 0.37 | Pass |
| | 1350 | 1350.2 | 0.2 | 2.4 | 0.37 | Pass |
| Type J | °C | °C | °C | °C | °C | |
| | -200 | -200.6 | -0.6 | 0.8 | 0.33 | Pass |
| | 40 | 39.8 | -0.2 | 0.6 | 0.21 | Pass |
| | 275 | 275.2 | 0.2 | 0.9 | 0.32 | Pass |
| | 510 | 510.2 | 0.2 | 1.1 | 0.32 | Pass |
| | 750 | 750.0 | 0.0 | 1.4 | 0.32 | Pass |
| Type K | °F | °F | °F | °F | °F | |
| | -300 | -299.8 | 0.2 | 1.3 | 0.70 | Pass |
| | 390 | 390.2 | 0.2 | 1.4 | 0.55 | Pass |
| | 1075 | 1075.8 | 0.8 | 2.1 | 0.55 | Pass |
| | 1760 | 1761.0 | 1.0 | 2.8 | 0.55 | Pass |
| | 2450 | 2451.3 | 1.3 | 3.5 | 0.84 | Pass |
| Type K | °C | °C | °C | °C | °C | |
| | -150 | -150.0 | 0.0 | 0.8 | 0.40 | Pass |
| | 210 | 210.1 | 0.1 | 0.8 | 0.32 | Pass |
| | 575 | 575.5 | 0.5 | 1.2 | 0.32 | Pass |
| | 940 | 940.6 | 0.6 | 1.5 | 0.32 | Pass |
| | 1300 | 1300.8 | 0.8 | 1.9 | 0.47 | Pass |
| T1Input -T2 Input | | 0.0 | 0.0 | 1.0 | 0.40 | Pass |
| T2 Input | °F | °F | °F | °F | °F | |
| Type J | -300 | -300.8 | 0.8 | 1.3 | 0.57 | Pass |
| | 110 | 109.8 | 0.2 | 1.1 | 0.31 | Pass |
| | 525 | 525.3 | 0.3 | 1.5 | 0.37 | Pass |
| | 940 | 940.5 | 0.5 | 1.9 | 0.37 | Pass |
| | 1350 | 1350.2 | 0.2 | 2.4 | 0.37 | Pass |
| Type J | °C | °C | °C | °C | °C | |
| | -200 | -200.4 | -0.4 | 0.8 | 0.33 | Pass |
| | 40 | 39.9 | -0.1 | 0.6 | 0.21 | Pass |
| | 275 | 275.2 | 0.2 | 0.9 | 0.32 | Pass |
| | 510 | 510.3 | 0.3 | 1.1 | 0.32 | Pass |
| | 750 | 750.1 | 0.1 | 1.4 | 0.32 | Pass |

Southwest Research Institute
Calibration Laboratory
Measurement Report

| | | | | | |
|------------|-----------|-------|---------------------|------------|-----------|
| Work Order | 303077010 | Mfr. | OMEGA | Technician | JRG |
| Asset No. | 001997 | Model | HH22 | | |
| Serial No. | T-94140 | Type | Digital Thermometer | Cal Date | 17-Oct-07 |

| Function/Range | Test Point | TI Reading | Difference | +/-Limit | +/-Uncertainty | Found/Left |
|----------------|------------|------------|------------|----------|----------------|------------|
| Type K | °F | °F | °F | °F | °F | Result |
| | -300 | -299.6 | 0.4 | 1.3 | 0.70 | Pass |
| | 390 | 390.3 | 0.3 | 1.4 | 0.55 | Pass |
| | 1075 | 1076.0 | 1.0 | 2.1 | 0.55 | Pass |
| | 1760 | 1761.3 | 1.3 | 2.8 | 0.55 | Pass |
| | 2450 | 2451.6 | 1.6 | 3.5 | 0.84 | Pass |
| Type K | °C | °C | °C | °C | °C | |
| | -150 | -149.7 | 0.3 | 0.8 | 0.40 | Pass |
| | 210 | 210.2 | 0.2 | 0.8 | 0.32 | Pass |
| | 575 | 575.6 | 0.6 | 1.2 | 0.32 | Pass |
| | 940 | 940.6 | 0.6 | 1.5 | 0.32 | Pass |
| | 1300 | 1300.9 | 0.9 | 1.9 | 0.47 | Pass |

END OF REPORT