



# SOUTHWEST RESEARCH INSTITUTE™

6220 Culebra Road, P.O. Drawer 28510  
Institute Quality Systems  
Institute Calibration Laboratory  
Phone: 210-522-5215 Fax 210-522-3692

## Certificate of Calibration

**Submitted By:** DIV20  
**Address:** B57  
**Contact:** KEN CHIANG  
**Manufacturer Model:** OMEGA Type B  
**Description:** THERMOCOUPLE  
**Serial No:** 11116  
**Asset No:** 011116  
**Procedure:** THERMOCOUPLE GENERAL, JAN/03

**Work Order:** 444060486  
**Date Issued:** Aug 26, 2004  
**Calibration Date:** Aug 26, 2004  
**\*\*Calibration Due:** Feb 26, 2005  
**Calibration Location:** Bldg. 64  
**Environment:** Temp. 73.0°F Hum. 40 %RH  
**\*As Found:** IN TOLERANCE  
**\*As Left:** IN TOLERANCE

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, 1999 and ANSI/NCCL Z540-1-1994 which are equivalent to relevant requirements of the ISO 9000-1994 series of standards. This certificate may not be reproduced, except in full, without the written approval of the Southwest Research Institute Calibration Laboratory. The results of this calibration relate only to the individual instrument described above. This certificate shall not be used to claim product endorsement by the American Association for Laboratory Accreditation (A2LA) or any agency of the U. S. Government

Uncertainty evaluation includes the item under test and is calculated in accordance with the ISO "Guide to the Expression of Uncertainty in Measurement" (GUM). The uncertainty represents an expanded uncertainty using a coverage factor of  $k=2$  to approximate a 95% confidence level. See Remarks or attached Calibration Report with the same Work Order number for calibration data.

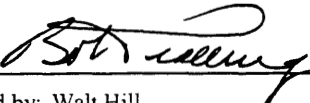
\*The client has sole responsibility for determination of in/out of tolerance or compliance/noncompliance. An in/out of tolerance opinion is provided for your convenience based only on the Test Instrument (TI) reading(s) and limits as reported. The reported uncertainty relates only to the results at the time of calibration and does not imply any short or long term stability of the TI.

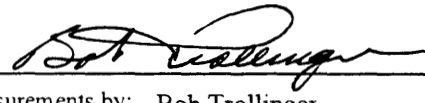
\*\*Calibration interval is determined by the client and does not assure the instrument will remain within tolerance until this date. Any number of factors may cause the instrument to be out of tolerance before the next calibration date.

**Remarks:** None

### Standards Used

Asset	Manufacturer	Model	Description	Cal Due
010813	HART SCIENTIFIC	5650	THERMOCOUPLE	Mar 19, 05
010814	HART SCIENTIFIC	1529	TC METER	Apr 16, 05

  
Approved by: Walt Hill  
Metrology Group Leader

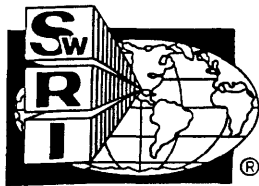
  
Measurements by: Bob Trollinger  
Metrology Technician

Southwest Research Institute  
 Calibration Laboratory  
 Measurement Report

Work Order	444060486	Mfr	OMEGA	Tech:	blt
Asset No.	011116	Model	TYPE B	Cal Date:	26-Aug-04
Serial No.	11116	Type	THERMOCOUPLE		
Remarks:					

Function/Range	Test Point	TI Reading	Difference	+/-Limits	+/-Uncertainty	Found/Left
	°C	°C	°C	°C	°C	Results
TEMPERATURE						
1100 °C	1095.31	1096.01	-0.70	5.5	1.6	Pass
1200 °C	1197.84	1195.85	1.99	6.0	1.6	Pass

END OF REPORT



# SOUTHWEST RESEARCH INSTITUTE™

6220 Culebra Road, P.O. Drawer 28510  
Institute Quality Systems  
Institute Calibration Laboratory  
Phone: 210-522-5215 Fax 210-522-3692



0972-01

## Certificate of Calibration

**Submitted By:** DIV20  
**Address:** B57  
**Contact:** KEN CHIANG  
**Manufacturer Model:** OMEGA Type B  
**Description:** THERMOCOUPLE  
**Serial No:** 11116  
**Asset No:** 011116  
**Procedure:** THERMOCOUPLE GENERAL, JAN/03

**Work Order:** 303062802  
**Date Issued:** Feb 10, 2005  
**Calibration Date:** Feb 10, 2005  
**\*\*Calibration Due:** Aug 10, 2005  
**Calibration Location:** Bldg. 64  
**Environment:** Temp. 73.0°F Hum. 40 %RH  
**\*As Found:** SEE REMARKS  
**\*As Left:** SEE REMARKS

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, 1999 and ANSI/NCCL Z540-1-1994 which are equivalent to relevant requirements of the ISO 9000-1994 series of standards. This certificate may not be reproduced, except in full, without the written approval of the Southwest Research Institute Calibration Laboratory. The results of this calibration relate only to the individual instrument described above. This certificate shall not be used to claim product endorsement by the American Association for Laboratory Accreditation (A2LA) or any agency of the U. S. Government.

Uncertainty evaluation includes the item under test and is calculated in accordance with the ISO "Guide to the Expression of Uncertainty in Measurement" (GUM). The uncertainty represents an expanded uncertainty using a coverage factor of k=2 to approximate a 95% confidence level. See Remarks or attached Calibration Report with the same Work Order number for calibration data.

\*The client has sole responsibility for determination of in/out of tolerance or compliance/noncompliance. An in/out of tolerance opinion is provided for your convenience based only on the Test Instrument (TI) reading(s) and limits as reported. The reported uncertainty relates only to the results at the time of calibration and does not imply any short or long term stability of the TI.

\*\*Calibration interval is determined by the client and does not assure the instrument will remain within tolerance until this date. Any number of factors may cause the instrument to be out of tolerance before the next calibration date.

**Remarks:** Cal at 900, 1000 1100 Deg C

### Standards Used

Asset	Manufacturer	Model	Description	Cal Due
010329	FLUKE	525A	TEMPERATURE/PRESSURE CALIBRATOR	Sep 24, 05
010813	HART SCIENTIFIC	5650	THERMOCOUPLE	Dec 06, 05
010814	HART SCIENTIFIC	1529	THERMOCOUPLE THERMOMETER	Apr 16, 05

Approved by: Walt Hill  
Metrology Group Leader

Measurements by: Bob Trollinger  
Metrology Technician

Southwest Research Institute  
Calibration Laboratory  
Measurement Report

Work Order	303062802	Mfr	OMEGA	Tech:	blt
Asset No.	011116	Model	TYPE B	Cal Date:	10-Feb-05
Serial No.	11116	Type	THERMOCOUPLE		
Remarks:					
Limits are based on ASTM E230-02					

Function/Range	Test Point	TI Reading	Difference	+/-Limits	+/-Uncertainty	Found/Left
	°C	°C	°C	°C	°C	Result
TEMPERATURE						
900 °C	900.6428	900.39	0.25	6.8	1.7	Pass
1000 °C	1001.270	1001.07	0.20	7.5	1.7	Pass
1100 °C	1100.478	1100.88	-0.40	8.3	1.7	Pass
END OF REPORT						