



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: BRADLEY WERLING

Manufacturer Model: BARNSTEAD INTL. E896X5

Description: RESISTOR

Serial No: 896020321720

Asset No: 009582

Procedure: RESISTORS, CL-70, JUN/99

Work Order: 444054466

Date Issued: Jul 22, 2003

Calibration Date: Jul 15, 2003

****Calibration Due:** Jul 15, 2004

Calibration Location: Bldg. 64

Environment: Temp. 72.0°F Hum. 36 %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/NCSL 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. The calibration process provides a Test Uncertainty Ratio (TUR) of less than or equal to 25% (4:1) of the test limit unless otherwise stated in remarks or an attachment.

*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: 1.5051 Mohm (+/- 0.0053 Mohm) and 553.3 ohm (+/- 0.0085 ohm)

Standards Used

Asset	Manufacturer	Model	Description	Cal Due
001505	HEWLETT-PACKARD	3458A/OPT-002	MULTIMETER	Apr 14, 04

Approved by: Walt Hill
Metrology Group Leader

m:\Nona2\la1.rpt Rev date 15, August 02

Measurements by: Tom Hannon
Metrology Technician

Southwest Research Institute
Calibration Laboratory
Calibration Report

Work Order:	444054466	Mfr.	Barnstead Int.	Technician	TJH
Asset No.	009582	Model	E896X5		
Serial No.	896020321720	Type.	Resistor	Cal Date.	15-Jul-03
Remarks:					
Tested to +/- 1 %					

Function/Range	Test Point	TI Reading	Difference	+/-Limit	+/-Uncertainty	Found/Left
	MOhm	MOhm	MOhm	MOhm	MOhm	Result
1.5 Mohm	1.5000	1.5051	0.0051	0.0150	0.0053	Pass
	Ohm	Ohm	Ohm	Ohm	Ohm	
552.95 Ohm	552.95	553.300	0.350	5.53	0.0085	Pass
END OF REPORT						



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Certificate #

0972-01

Certificate of Calibration

Submitted By: DIV20

Address: B57

Contact: BRADLEY WERLING

Manufacturer Model: BARNSTEAD INTL. E896X5

Description: RESISTOR

Serial No: 896020321720

Asset No: 009582

Procedure: RESISTORS JAN/04

Work Order: 444059675

Date Issued: Jun 25, 2004

Calibration Date: Jun 24, 2004

****Calibration Due:** Jun 24, 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/NCSL 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:

Standards Used

Asset	Manufacturer	Model	Description	Cal Due
001505	HEWLETT-PACKARD	3458A/OPT-002	MULTIMETER	Mar 19, 05

Approved by: Walt Hill
Metrology Group Leader

m:\a2la1.rpt Rev date 11, May 04

Measurements by: Scott Kester
Metrology Technician

Southwest Research Institute
Calibration Laboratory
Calibration Report

Work Order:	444059675	Mfr.	Barnstead Int.	Technician	SRK
Asset No.	009582	Model	E896X5		
Serial No.	896020321720	Type.	Resistor	Cal Date.	24-Jun-04

Remarks:

Tested to +/- 1 %

Function/Range	Test Point	TI Reading	Difference	+/-Limit	+/-Uncertainty	Found/Left
	MOhm	MOhm	MOhm	MOhm	MOhm	Result
1.5 Mohm	1.5000	1.5054	0.0053	0.0150	0.0053	Pass
	Ohm	Ohm	Ohm	Ohm	Ohm	
552.95 Ohm	552.95	553.315	0.365	5.53	0.0085	Pass

END OF REPORT