



SOUTHWEST RESEARCH INSTITUTE®

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Institute Calibration Laboratory
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Certificate of Calibration

0972-01

Submitted By: DIV20
Address: B57
Contact: DON BANNON
Manufacturer Model: KEITHLEY 614
Description: ELECTROMETER
Serial No: 0704936
Asset No: 007089
Procedure: KEITHLEY 614 - 10 MAY 2006

Work Order: 303069219
Date Issued: May 17, 2006
Calibration Date: May 17, 2006
***Calibration Due:** May 17, 2007
Calibration Location: Bldg. 64
Environment: Temp. 74.0°F Hum. 42 %RH
****Data Type:** FOUND-LEFT

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, ANSI/NC SL 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
000101	86052	BIDDLE	72-5346-1	DECADE RESISTOR	Jan 05, 07
000108	7993	GENERAL RADIO	1433G	DECADE RESISTOR	Apr 24, 07
000182	5200003	FLUKE	5700A/EP	CALIBRATOR	Jun 15, 06
009753	710427	GEN RAD	1422-CB	CAPACITOR STANDARD	Oct 24, 06

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Instrument calibration record for Keithley
Electrometer, Model # 614, Serial # 0704936
(05/17/2006)
Q200605230001

Reviewed by: blt () jrg () pwc () wgl ()
Metrology Technician
m:\a2la1.rpt Rev date August 15, 2005

Measurements by: Paul Depmore
Metrology Technician

Southwest Research Institute
Calibration Laboratory
Measurement Report

Work Order:	303069219	Mfr.	KEITHLEY	Technician	PRD
Asset No.	007089	Model	614	Cal Date.	17-May-06
Serial No.	0704936	Type.	Electrometer		

Remarks:

Function/Range	Test Point	TI Reading	Difference	+/-Test Limits	+/-Uncertainty	Found/Left
Zero	mVolts 0.00000	mVolts 0.00000	mVolts 0.00000	mVolts 0.00001	mVolts 0.0000012	Results Pass
DCV	Volts	Volts	Volts	Volts	Volts	
0.2 V	0.19000 -0.19000	0.18998 -0.18999	-0.00002 0.00001	0.00017 0.00017	0.000022 0.000022	Pass Pass
2 Volt	1.9000 -1.9000	1.8999 -1.8998	-0.0001 0.0002	0.0016 0.0016	0.00012 0.00012	Pass Pass
20 Volt	19.000 -19.000	18.997 -18.996	-0.003 0.004	0.016 0.016	0.0012 0.0012	Pass Pass
DC Amps	uAmps	uAmps	uAmps	uAmps	uAmps	
200 uAmp	190.0 nAmps	189.9 nAmps	-0.1 nAmps	0.7 nAmps	0.120 nAmps	Pass
200 nAmp	190.0 pAmps	190.1 pAmps	0.1 pAmps	1.0 pAmps	0.12 pAmps	Pass
2000 pAmp	1900	1894	-6	29	1.2	Pass
Resistance	kOhm	kOhm	kOhm	kOhm	kOhm	
20 kOhm	19.00	18.99	-0.01	0.11	0.012	Pass
200 kOhm	190.0	189.7	-0.3	1.1	0.12	Pass
	MOhm	MOhm	MOhm	MOhm	MOhm	
20 MOhm	10.00	9.99	-0.01	0.10	0.012	Pass
	GOhm	GOhm	GOhm	GOhm	GOhm	
20 GOhm	10.00	9.99	-0.01	0.02	0.014	Pass
Charge Calibration	nC	nC	nC	nC	nC	
2 n Coulomb	1.0000	1.0464	0.0464	0.0500	0.00012	Pass

END OF REPORT