



SOUTHWEST RESEARCH INSTITUTE®

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Institute Calibration Laboratory
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Calibration Laboratory
Certificate #0972-01

Certificate of Calibration

Submitted By: DIV20

Address: B57

Contact: DON BANNON

Manufacturer / Model: KEITHLEY / 614

Description: ELECTROMETER

Serial No: 0704934

Asset No: 007088

Procedure: KEITHLEY 614 - 10 MAY 2006

Work Order: 303075290

Date Issued: Jul 6, 2007

Calibration Date: Jul 6, 2007

*Calibration Due: Jul 6, 2008

Calibration Location: Bldg. 64

Environment: Temp. 71.0°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: nC function not cal'd

Standards Used

Asset No.	Serial No.	Manufacturer	Model	Description	Cal Due
009829	A20602851959A	ESI	SR1050-10M	DECADE RESISTOR	Feb 15, 08
000101	86052	BIDDLE	72-6346-1	DECADE RESISTOR	Apr 20, 08
000182	5200003	FLUKE	5700A/EP	CALIBRATOR	Aug 24, 07
000185	26851	GENERAL RADIO	1433G	DECADE RESISTOR	Mar 05, 09

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:	303075290	Mfr.	KEITHLEY	Technician	JRG
Asset No.	007088	Model	614		
Serial No.	0704934	Type.	Electrometer	Cal Date.	06-Jul-07
Remarks:					
nC not calibrated per customer.					

Function/Range	Test Point	TI Reading	Difference	+/-Test Limits	+/-Uncertainty	Found/Left
Zero	mVolts	mVolts	mVolts	mVolts	mVolts	Results
	0.00000		0.00000	0.00001	0.0000012	Pass
DCV	Volts	Volts	Volts	Volts	Volts	
0.2 V	0.19000	0.18999	-0.00001	0.00017	0.000022	Pass
	-0.19000	-0.19002	-0.00002	0.00017	0.000022	Pass
2 Volt	1.9000	1.8999	-0.0001	0.0016	0.00012	Pass
	-1.9000	-1.8999	0.0001	0.0016	0.00012	Pass
20 Volt	19.000	18.999	-0.001	0.016	0.0012	Pass
	-19.000	-18.999	0.001	0.016	0.0012	Pass
DC Amps	uAmps	uAmps	uAmps	uAmps	uAmps	
200 uAmp	190.0	190.0	0.0	0.7	0.120	Pass
	nAmps	nAmps	nAmps	nAmps	nAmps	
200 nAmp	190.0	190.3	0.3	1.0	0.12	Pass
	pAmps	pAmps	pAmps	pAmps	pAmps	
2000 pAmp	1900	1893	-7	29	1.2	Pass
Resistance	kOhm	kOhm	kOhm	kOhm	kOhm	
20 kOhm	19.00	18.97	-0.03	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	9.97	-0.03	0.10	0.012	Pass
	GOhm	GOhm	GOhm	GOhm	GOhm	
20 GOhm	10.00	10.00	0.00	0.02	0.014	Pass

END OF REPORT