SOUTHWEST RESEARCH INSTITUTE™

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Institute Calibration Laboratory
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COPY

ACCREDITED
Certificate #
0972-01

Certificate of Calibration

Submitted By:	DIV20	**Work Order:**	444061748
Address:	B57	**Date Issued:**	Dec 2, 2004
Contact:	DARRELL DUNN	**Calibration Date:**	Dec 2, 2004
Manufacturer Model:	KEITHLEY 614	****Calibration Due:**	Dec 2, 2005
Description:	ELECTROMETER	**Calibration Location:**	Bldg. 64
Serial No:	467374	**Environment:**	Temp. 74.0°F Hum. 38 %RH
Asset No:	001438	***As Found:**	IN TOLERANCE
Procedure:	CL-741, APR/03	***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: None

Standards Used

Asset	Manufacturer	Model	Description	Cal Due
000101	BIDDLE	72-5346-1	DECADE RESISTOR	Nov 16, 05
000182	FLUKE	5700A/EP	CALIBRATOR	Dec 23, 04
000185	GENERAL RADIO	1433G	DECADE RESISTOR	Mar 05, 05
009753	GEN RAD	1422-CB	CAPACITOR STANDARD	Oct 26, 05

Approved by: Walt Hill
Metrology Group Leader

Measurements by: Scott Kester
Metrology Technician

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

Southwest Research Institute
Calibration Laboratory
Measurement Report

Work Order:	444061748	Mfr.	KEITHLEY	Technician	SRK
Asset No.	001438	Model	614		
Serial No.	467374	Type.	Electrometer	Cal Date.	02-Dec-04
Remarks:					

Function/Range	Test Point	TI Reading	Difference	+/-Test Limits	+/-Uncertainty	Found/Left
Zero	mVolts	mVolts	mVolts	mVolts	mVolts	Results
	0.00000	-0.00001	-0.00001	0.00001	0.0000012	Pass
Reference	10.0000					
DCV	Volts	Volts	Volts	Volts	Volts	
0.2 V	0.19000	0.19000	0.00000	0.00017	0.000022	Pass
	0.10000	0.10000	0.00000	0.00010	0.000022	Pass
2 Volt	1.9000	1.8998	-0.0002	0.0016	0.00012	Pass
	1.0000	1.0000	0.0000	0.0009	0.00012	Pass
20 Volt	19.000	18.997	-0.003	0.016	0.0012	Pass
	10.000	9.999	-0.001	0.009	0.0012	Pass
DC Amps	uAmps	uAmps	uAmps	uAmps	uAmps	
20 uAmp	19.00	18.99	-0.01	0.08	0.014	Pass
	nAmps	nAmps	nAmps	nAmps	nAmps	
200 nAmp	190.0	190.1	0.1	1.1	0.12	Pass
	pAmps	pAmps	pAmps	pAmps	pAmps	
2000 pAmp	1900	1894	-6	29	0.12	Pass
Resistance	kOhm	kOhm	kOhm	kOhm	kOhm	
20 kOhm	19.00	18.99	-0.01	0.11	0.012	Pass
200 kOhm	190.0	189.8	-0.2	1.1	0.12	Pass
	MOhm	MOhm	MOhm	MOhm	MOhm	
20 MOhm	10.00	9.98	-0.02	0.10	0.012	Pass
	GOhm	GOhm	GOhm	GOhm	GOhm	
20 GOhm	10.00	10.05	0.05	0.22	0.014	Pass
Charge Calibration						
2 nC	1.0000	0.9987	-0.0013	0.0500	0.00012	Pass

END OF REPORT