SOUTHWEST RESEARCH INSTITUTE®
6220 Culebra Road, P.O. Drawer 28510
Institute Quality Systems
Institute Calibration Laboratory
Phone: 210-522-5215 Fax 210-522-4834

ACCREDITED
Calibration Laboratory
Certificate #0972-01

Certificate of Calibration

Cost Center / Customer: DIV20 / DON BANNON
Mail Stop: B57
Manufacturer/Model: KEITHLEY / 614
Description: ELECTROMETER
Serial Number: 0704936
Asset Number: 007089
Procedure: KEITHLEY 614 - 21 MAR 09

Work Order: 303101363
Date Issued: 11-May-2011
Date Calibrated: 11-May-2011
*** Date Due :** 11-May-2012
**** Results:** FOUND-LEFT
Temperature: 74.0 °F
Humidity: 40 %RH
Barometer: 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. **Data type found in this certificate or attached measurement report must be interpreted as: Found-left - adjustment and/or repair was not performed, As-found - data is before unit is adjusted and/or repaired, As-left - data is after adjusted and/or repaired was performed. The customer has sole responsibility for determination of in-/out-of-tolerance or compliance/noncompliance.

Measurement uncertainty calculated in accordance with the method described in the ISO "Guide to the Expression of Uncertainty in Measurement" (GUM), for a confidence level of approximately 95 percent using a coverage factor of $k=2$.

Remarks: nC not cal'd

Standards Used

Asset #	Manufacturer	Model	Description	Cal Date	Due Date
000101	BIDDLE	72-6346-1	DECADE RESISTOR	30-Aug-2010	30-Aug-2011
000182	FLUKE	5700A/EP	MULT-FUNCTION CALIBRATOR	2-May-2011	2-Aug-2011
001505	HEWLETT-PACKARD	3458A/OPT 002	MULTIMETER	30-Mar-2011	30-Mar-2012
014917	FLUKE	742A-10M	RESISTOR, STANDARD	21-Sep-2010	21-Sep-2011

Walt Hill
Laboratory Manager

Bob Trollinger
Metrology Technician

m:\\A2LA OCT_08.rpt

Southwest Research Institute
Calibration Laboratory
Measurement Report

Work Order:	303101363	Mfr.	KEITHLEY	Technician	blt
Asset No.	007089	Model	614	Type Data:	Found-left
Serial No.	0704936	Type.	Electrometer	Cal Date.	11-May-11
Remarks: nC not calibrated per customer.					

Function/Range	Test Point	TI Reading	Difference	± Limits	± Uncertainty	Result	% Limit
Zero	Volts	Volts	Volts	Volts	Volts		
0.2 V	0.19000	0.18997	-0.00003	0.00017	0.000010	Pass	18%
	-0.19000	-0.18998	0.00002	0.00017	0.000010	Pass	12%
2 Volt	1.9000	1.8998	-0.0002	0.0016	0.00010	Pass	12%
	-1.9000	-1.8997	0.0003	0.0016	0.00010	Pass	19%
20 Volt	19.000	18.996	-0.004	0.016	0.0010	Pass	25%
	-19.000	-18.995	0.005	0.016	0.0010	Pass	31%
DC Amps	µAmps	µAmps	µAmps	µAmps	µAmps		
200 uAmp	190.0	189.9	-0.1	0.7	0.055	Pass	14%
	nAmps	nAmps	nAmps	nAmps	nAmps		
200 nAmp	190.0	190.1	0.1	1.0	0.055	Pass	10%
	pAmps	pAmps	pAmps	pAmps	pAmps		
2000 pAmp	1900	1898	-2	29	0.50	Pass	7%
Resistance	kohm	kohm	kohm	kohm	kohm		
20 kohm	19.00	18.98	-0.02	0.11	0.0058	Pass	18%
200 kohm	190.0	189.6	-0.4	1.1	0.058	Pass	36%
	Mohm	Mohm	Mohm	Mohm	Mohm		
20 Mohm	10.00	9.98	-0.02	0.10	0.0058	Pass	20%
	Gohm	Gohm	Gohm	Gohm	Gohm		
20 Gohm	9.97	9.99	0.02	0.04	0.0058	Pass	50%

END OF REPORT