



SOUTHWEST RESEARCH INSTITUTE®

6220 Culebra Road, P.O. Drawer 28510
Institute Quality Systems
Institute Calibration Laboratory
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Calibration Laboratory
Certificate #0972-01

Certificate of Calibration

Cost Center / Customer: DIV20 / DON BANNON

Mail Stop: B51

Manufacturer/Model: KEITHLEY / 614

Description: ELECTROMETER

Serial Number: 0704936

Asset Number: 007089

Procedure: KEITHLEY 614 - 21 MAR 09

Work Order: 303093955

Date Issued: 22-Apr-2010

Date Calibrated: 22-Apr-2010

*** Date Due :** 22-Apr-2011

**** 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/NCCL 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

<u>Asset #</u>	<u>Manufacturer</u>	<u>Model</u>	<u>Description</u>	<u>Cal Date</u>	<u>Due Date</u>
000101	BIDDLE	72-6346-1	DECADE RESISTOR	24-Aug-2009	24-Aug-2010
000182	FLUKE	5700A/EP	CALIBRATOR	3-Feb-2010	3-May-2010
001505	HEWLETT-PACKARD	3458A/OPT 002	MULTIMETER	5-Feb-2010	5-Feb-2011
014917	FLUKE	742A-10M	STANDARD RESISTOR	23-Sep-2009	23-Sep-2010

Walt Hill

Laboratory Manager

Bob Trollinger

Metrology Technician

Southwest Research Institute
Calibration Laboratory
Measurement Report

Work Order:	303093955	Mfr.	KEITHLEY	Technician	blt
Asset No.	007089	Model	614	Type Data:	Found-left
Serial No.	0704936	Type.	Electrometer	Cal Date.	22-Apr-10
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	-0.18997	0.00003	0.00017	0.000010	Pass	18%
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 µAmp	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	1897	-3	29	0.50	Pass	10%
Resistance	kohm	kohm	kohm	kohm	kohm		
20 kohm	19.00	19.00	0.00	0.11	0.0058	Pass	0%
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	10.01	10.02	0.01	0.04	0.0058	Pass	23%

END OF REPORT