



SOUTHWEST RESEARCH INSTITUTE®

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Institute Quality Systems
Institute Calibration Laboratory
Phone: 210-522-5215 Fax 210-522-4834



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: 467374

Asset Number: 001438

Procedure: KEITHLEY 614 - 21 MAR 09

Work Order: 303092907

Date Issued: 3-Mar-2010

Date Calibrated: 3-Mar-2010

*** Date Due :** 3-Mar-2011

**** Results:** FOUND-LEFT

Temperature: 72.0 °F

Humidity: 38 %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 FUNCTION NOT CALIBRATED

Standards Used

<u>Asset #</u>	<u>Manufacturer</u>	<u>Model</u>	<u>Description</u>	<u>Cal Date</u>	<u>Due Date</u>
000101	BIDDLE	72-5346-1	DECADE RESISTOR	24-Aug-2009	24-Aug-2010
000108	GENERAL RADIO	1433G	DECADE RESISTOR	10-Apr-2009	10-Apr-2010
000182	FLUKE	5700A/EP	CALIBRATOR	3-Feb-2010	3-May-2010
014917	FLUKE	742A-10M	STANDARD RESISTOR	23-Sep-2009	23-Sep-2010

Walt Hill

Laboratory Manager

Carlos Mendoza

Metrology Technician

Southwest Research Institute
Calibration Laboratory
Measurement Report

Work Order:	303092907	Mfr.	KEITHLEY	Technician	com
Asset No.	001438	Model	614	Type Data:	Found-left
Serial No.	467374	Type.	Electrometer	Cal Date.	3-Mar-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	0.19001	0.00001	0.00017	0.000010	Pass	6%
	-0.19000	-0.19001	-0.00001	0.00017	0.000010	Pass	6%
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	18.997	-0.003	0.016	0.0010	Pass	19%
	-19.000	-18.996	0.004	0.016	0.0010	Pass	25%
DC Amps	µAmps	µAmps	µAmps	µAmps	µAmps		
200 uAmp	190.0	189.9	-0.1	0.7	0.055	Pass	14%
200 nAmp	nAmps	nAmps	nAmps	nAmps	nAmps		
	190.0	190.1	0.1	1.0	0.055	Pass	10%
2000 pAmp	pAmps	pAmps	pAmps	pAmps	pAmps		
	1900	1896	-4	29	0.50	Pass	14%
Resistance	kohm	kohm	kohm	kohm	kohm		
20 kohm	19.00	18.99	-0.01	0.11	0.0058	Pass	9%
	200 kohm	190.0	189.8	-0.2	1.1	0.058	Pass
20 Mohm	Mohm	Mohm	Mohm	Mohm	Mohm		
	10.00	9.98	-0.02	0.10	0.0058	Pass	20%
20 Gohm	Gohm	Gohm	Gohm	Gohm	Gohm		
	9.99	9.98	-0.01	0.04	0.0058	Pass	25%

END OF REPORT