



SOUTHWEST RESEARCH INSTITUTE®

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



Certificate of Calibration

0972-01

Submitted By: DIV20
Address: B57
Contact: DON BANNON
Manufacturer Model: KEITHLEY 617
Description: ELECTROMETER
Serial No: 537418
Asset No: 001044
Procedure: KEITHLEY 617 - 3 MAY 2006

Work Order: 303068995
Date Issued: May 9, 2006
Calibration Date: May 9, 2006
***Calibration Due:** Nov 9, 2006
Calibration Location: Bldg. 64
Environment: Temp. 74.0°F Hum. 42 %RH
****Data Type:** FOUND-LEFT

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, 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: Limit Cal: 2pA and 20pA not Calibrated

Standards Used

Asset No.	Serial No.	Manufacturer	Model	Description	Cal Due
000101	86052	BIDDLE	72-5346-1	DECADE RESISTOR	Jan 05, 07
000108	7993	GENERAL RADIO	1433G	DECADE RESISTOR	Apr 24, 07
000182	5200003	FLUKE	5700A/EP	CALIBRATOR	Jun 15, 06
009753	710427	GEN RAD	1422-CB	CAPACITOR STANDARD	Oct 24, 06
012066	MY45040419	HEWLETT-PACKARD	3458A	MULTIMETER	Apr 11, 07

120

Instrument calibration record for
Programmable Electrometer, Keithley, Model
617, Serial # 537418 (05/09/2006)
Q200605160010

Reviewed by: blt () jrg () pwc () wgh ()
Metrology Technician

Measurements by: Paul Depmore
Metrology Technician

Southwest Research Institute
Calibration Laboratory
Measurement Report

Work Order:	303068995	Mfr:	KEITHLEY	Technician:	PRD
Asset No:	001044	Model:	617	Cal Date:	09-May-06
Serial No:	537418	Type:	ELECTROMETER		
Remarks:					
2pA and 20 pA not calibrated.					

Function/Range	Test Point	TI Reading	Difference	+/-Test Limits	+/-Uncertainty	Found/Left
DC Amps	pAmps	pAmps	pAmps	pAmps	pAmps	Result
200 pA	190.00	189.95	-0.05	3.05	0.031	Pass
	nAmps	nAmps	nAmps	nAmps	nAmps	
2 nA	1.9000	1.8987	-0.0013	0.0053	0.00022	Pass
20 nA	19.000	18.999	-0.001	0.049	0.0022	Pass
200 nA	190.00	189.98	-0.02	0.49	0.031	Pass
	uAmps	uAmps	uAmps	uAmps	uAmps	
2 uA	1.9000	1.8990	-0.0010	0.0033	0.00019	Pass
20 uA	19.000	18.999	-0.001	0.030	0.0019	Pass
200 uA	190.00	190.03	0.03	0.30	0.019	Pass
	mAmps	mAmps	mAmps	mAmps	mAmps	
2 mA	1.9000	1.9002	0.0002	0.0033	0.00014	Pass
20 mA	19.000	18.996	-0.004	0.030	0.0014	Pass
	nC	nC	nC	nC	nC	
2 nC	1.000	0.997	-0.003	0.005	0.0012	Pass
DCV	mVolts	mVolts	mVolts	mVolts	mVolts	
200 mVolt	190.00	190.01	0.01	0.14	0.012	Pass
	Volts	Volts	Volts	Volts	Volts	
2 Volt	1.9000	1.9001	0.0001	0.0011	0.00012	Pass
20 Volt	19.000	19.001	0.001	0.011	0.0012	Pass
200 Volt	190.00	190.03	0.03	0.14	0.012	Pass
Resistance	MOhm	MOhm	MOhm	MOhm	MOhm	
20 GOhm	10000	10002	2	4	1.2	Pass
2 GOhm	1000.0	999.2	-0.8	1.6	0.16	Pass
200 MOhm	100.00	99.89	-0.11	0.31	0.10	Pass
20 MOhm	10.000	10.000	0.000	0.026	0.0012	Pass
2 MOhm	1.0000	1.0010	0.0010	0.0026	0.00012	Pass
	kOhm	kOhm	kOhm	kOhm	kOhm	
200 kOhm	100.00	100.00	0.00	0.26	0.012	Pass
20 kOhm	10.000	10.000	0.000	0.016	0.0017	Pass
2 kOhm	1.0000	1.0004	0.0004	0.00211	0.00010	Pass
Voltage Source	Volts	Volts	Volts	Volts	Volts	
	0.000	0.032	0.032	0.050	0.0012	Pass
	1.000	1.016	0.016	0.052	0.0012	Pass
	10.000	10.013	0.013	0.070	0.0012	Pass
	25.000	25.017	0.017	0.100	0.0015	Pass
	50.000	50.021	0.021	0.150	0.0015	Pass
	100.000	100.034	0.034	0.250	0.0012	Pass

END OF REPORT