

SOUTHWEST RESEARCH INSTITUTE

Department of Quality Assurance

Calibration Laboratory • 522-5215

WORK ORDER

CERTIFICATE # 24748 ASSET # 001438 DATE 19 MAR 97

ITEM DATA:

Manufacturer Keithley Model 614
Description Electrometer Serial # 467374
Accessories Triaxial cable

ACTION REQUESTED Calibration
1-23897

CUSTODIAN DW 20 D. DUNN

Turned in by: D. Dunn Phone 6090

CHARGE # 20-5708-501 Date Required _____

INSTRUMENT USED ON: NUCLEAR DOD NASA GLP SPPE
 OTHER _____

COPY OF CALIBRATION CERTIFICATE Yes No

CONDITION RECEIVED: _____ Out of tolerance, repaired to specifications
_____ In tolerance, minor adjustments/repairs made
 In tolerance, no adjustments/repairs
_____ Out of tolerance, adjusted to specifications
_____ Received into system, introduced or reactivated
12mos Calibration interval
5 Reliability code

24748

ACTION TAKEN: (Calibration/Repair/Parts) Perho ST# 297075 as/1/97.

Cal cycle O.K.
Wend

CAL ENVIRONMENT:
Temperature 73 °F Humidity 31 %RH

CALIBRATED/REPAIRED:
By Perho Dev., San Antonio, TX Cal Procedure MEG
Date 03/21/97 Accuracy MEG
Cal Interval 12mos Time to complete: _____
Next Cal due 03/21/98 Cal _____ Repair _____
Standards used (Asset#) Under

DATE COMPLETED 24 Mar 97
DATE PICKED UP 3/26/97 PICKED UP BY [Signature]



Rothe Development Inc.

Metrology Services Division

4614 SINCLAIR RD., SAN ANTONIO, TEXAS 78222 210-648-3131 FAX 210-648-4091

Certificate of Calibration

47354

CAL DATE: 03/21/97

DUE DATE: 03/21/98

ISSUED TO: Southwest Research Institute (30)
6220 Culebra, Bldg. 64/Division 30
San Antonio, TX 78284
684-5111 * 2702

MFG Keithley

MODEL 614

SERIAL # 467374

CONTROL: 103 - 11152

TECHNICIAN #: 6

SPECIFICATIONS: MFG

PROCEDURE: MFG

WORK ORDER #: 58596

CUSTOMER PO #: 02127/ST297075/20-5708561

TYPE Electrometer

RECEIVED IN-SPECS
OUT-OF-SPECS

All Calibration measurements performed at ROTHE DEVELOPMENT INC. METROLOGY SERVICES meet the requirements of MIL-STD-45662A, and are traceable to the National Institute of Standards and Technology through Primary NIST Calibration or Secondary Calibration performed by other Metrological facilities. Ambient conditions: temperature 73°F, Relative Humidity 31%

Test Report Number and Calibration Standards Used

Ref #	Model #	Mfgr	Serial #	Description	Cal Date	Int	Cal Due
TR 75	NMN	JRL	75	RESISTANCE BOX	08/30/96	12	08/30/97
TR 20	5700A	FLUKE	4605002	CALIBRATOR	03/03/97	3	06/03/97

----- Test Report Numbers -----
 DCV FLUKE CERT# DH70
 ACV FLUKE CERT# DP30
 OHM NIST TEST# 255975
 P NIST TEST# 8980
 Hz MWVB Transmission

INSPECTED BY Jose A Mendez
COMMENTS:

NOTE: The collective uncertainty of the measurement standards does not exceed 25% (k)=4:1) of the instrument specification tested unless noted in COMMENTS section.

ROTHE DEVELOPMENT METROLOGY SERVICES

CALIBRATION DATA: KEITHLEY 614 ELECTROMETER

CUSTOMER: Southwest Research Inst.
 WO NUMBER: 58596
 SERIAL: 467374
 CUST ID: 23897

DATE: Mar 21, 97
 TECH: mm
 INST NO: 11152

CALIBRATION DATA TAKEN

INCOMING ✓
 OUTGOING ✓

CONDITION OF EQUIPMENT

IN TOLERANCE ✓
 OUT OF TOLERANCE _____

INPUT CURRENT VERIFICATION

RANGE	INPUT	MIN	READING	MAX
20 pA	NONE	-00.06	<u>00.01</u>	+00.06

DC VOLTMETER ACCURACY

RANGE	INPUT	MIN	READING	MAX
.2 V	0.0 mV	-.00002	<u>-.00000</u>	+.00002
	+190 mV	+.18983	<u>.19000</u>	+.19017
	-190 mV	-.18983	<u>-.19000</u>	-.19017
2 V	+1.9 V	+1.8984	<u>1.8999</u>	+1.9016
	-1.9 V	-1.8984	<u>-1.8998</u>	-1.9016
20 V	+19 V	+18.984	<u>18.998</u>	+19.016
	-19 V	-18.984	<u>-18.996</u>	-19.016

DC CURRENT ACCURACY

RANGE	INPUT	MIN	READING	MAX
200 uA	+190 uA	+189.3	<u>189.9</u>	+190.7
200 nA	+190 nA	+189.0	<u>190.1</u>	+191.0
2000 pA	+1900 pA	+1871	<u>1898</u>	+1929

RESISTANCE ACCURACY

RANGE		ACTUAL INPUT	TOLERANCE	READING
20 KΩ	(19)	<u>19.00</u>	±11 C	<u>18.99</u>
200 KΩ		<u>190.0</u>	±11 C	<u>189.8</u>
20 MΩ	(10)	<u>10.00</u>	±10 C	<u>9.99</u>
20 GΩ	(10)	<u>9.98</u>	±2 %	<u>9.98</u>

CHARGE ACCURACY

RANGE	INPUT	MIN	READING	MAX
2 nC	1.0 VDC INTO 1000 pF	0.9500	<u>.9914</u>	1.0500



Rothe Development, Inc.

4614 SINCLAIR RD. SAN ANTONIO, TEXAS 78222-2099

210-648-3131 FAX: 210-648-4091

METROLOGY SERVICES DIVISION
PRECISION MEASUREMENT EQUIPMENT LABORATORY
TRACEABLE TO NIST

CHARGE # 107

CONTROL # 103 - 11152

WORK ORDER # 58596

CUSTOMER

RECEIVED FROM Southwest Research Institute (30) DATE 03/20/97

ADDRESS 6220 Culebra, Bldg. 64/Division 30 PHONE# 684-5111 + 2702
San Antonio, TX 78284

CONTACT (NAME) Mr. Jim Patterson FAX# 522-3692

PURCHASE ORDER # 02127/ST297075/20-5708561

CUSTOMER COMMENTS N/T BEFORE & AFTER DATA OUT OF SPEC ITEM

I
T
E
M

MFG Keithley

MODEL 614

SERIAL # 467374

TYPE Electrometer

ACCES. RCVD. Triax

- REPAIR
- OPERATIONAL CHECK
- CALIBRATION

CALIBRATION DATE Mar 21, 97
DATE DUE Mar 21, 98

CALIBRATION INTERVAL
12 mo.

- RECEIVED IN SPECS.
- RECEIVED INOPERATIVE
- RECEIVED OUT OF SPECS.

CKT REF #	QTY.	MFG PART #	DESCRIPTION	COST	ROTHER TECH.	OUR P.O. #
					<i>Jm</i>	
					REPAIR LABOR HRS.	SERVICE CODE
						<i>J</i>
					PARTS TOTAL	
					REPAIR LABOR	
					SHIPPING	
					TEAR DOWN CHARGE	
					CALIBRATION	<i>100.00</i>
					TAX	
					TOTAL	100.00

THIS IS NOT AN INVOICE

TR #'s 75, 20

COMMENTS

WORK PERFORMED: Data taken

TEMP 73 °F

SPECS: MFG RDI

Calibrated

R.H. 31 %

PROCEDURE: MFG RDI OTHER

RDI 2002

SHIP VIA: _____ DATE: _____

RECEIVED BY: _____

SOUTHWEST RESEARCH INSTITUTE
Department of Quality Assurance
Calibration Laboratory • 522-5215

WORK ORDER

CERTIFICATE # 28773 ASSET # 0011192 DATE 25 Feb 98

ITEM DATA:

Manufacturer Ketchley Model 614
Description electrometer Serial # 461374
Accessories tray cable

ACTION REQUESTED cal

CUSTODIAN Dr. D. D. D. Dr. D. D. D. # 25897

Turned in by: J. D. D. Phone 4290

CHARGE # 20-1452-571 Date Required _____

INSTRUMENT USED ON: DOD/NASA NUCLEAR GLP SPPE ISO
OTHER _____

COPY OF CALIBRATION CERTIFICATE Yes No

NEW WORK Yes No If yes, an evaluation shall be made to verify capabilities.
By _____ Date _____

- CONDITION RECEIVED: _____ (F) Out of tolerance, repaired to specifications
_____ (G) In tolerance, minor adjustments/repairs made
 (J) In tolerance, no adjustments/repairs
_____ (K) Out of tolerance, adjusted to specifications
_____ (S) Received into system, introduced or reactivated

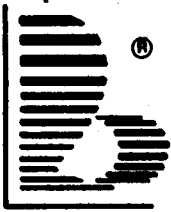
ACTION TAKEN: (Calibration/Repair/Parts) Revised Dev. # 318091 09/27

CAL ENVIRONMENT: Temperature 72 °F Humidity 35 %RH

CALIBRATED/REPAIRED:
By Rocke, Dev. Sam Antonio TX Cal Procedure MFG
Date 03/17/98 Accuracy MFG specs
Cal Interval 12 mos Reliability Code: 6
Next Cal due 03/17/99 Cal Time _____ Repair Time _____
Standards used (Asset#) Vonder

DATE COMPLETED 18 Mar 98
DATE PICKED UP 3/18/98 PICKED UP BY [Signature]

28773



CERT. NUMBER: 51960

ROTHE DEVELOPMENT, INC.

METROLOGY SERVICES DIVISION

4614 SINCLAIR RD., SAN ANTONIO, TEXAS 78222 PH:210-648-3131

CERTIFICATE OF CALIBRATION

ISSUED TO: Southwest Research Institute
6220 Culebra, Bldg. 64/Division 30
San Antonio, TX 78284
522-5460

(30) MFG: Keithley
MODEL: 614
NOMEN: Electrometer
S/N: 467374
CUST. ID:

CAL DATE: 03/17/1998
DUE DATE: 03/17/1999

CONTROL NO.: 103 - 11152
TECHNICIAN: 4
SPECIFICATIONS: MFG
PROCEDURE: MFG
WORK ORDER: 64239
CUSTOMER P.O.: 02127/ST318691/20-1402571
RECEIVED CONDITION: IN TOLERANCE
RETURNED CONDITION: IN TOLERANCE

CALIBRATION PERFORMED AT: RDMSD
CALIBRATION INTERVAL: 12mos.
TEMPERATURE: 72 °F
RELATIVE HUMIDITY: 35 %

DATE RECEIVED: 03/02/1998

COMMENTS:

ATTACHMENTS: CALIBRATION DATA

All Calibrations performed at Rothe Development, Inc. Metrology Services Division meet the requirements of ANSI/NCSL Z540-1-1994, ISO/IEC GUIDE 25, and ISO 10012-1, and are traceable to the National Institute of Standards and Technology. The collective uncertainty of the measurement(s) does not exceed 25% (TUR_>4:1) of the instrument specification(s) unless noted in the COMMENTS section.

TR#	MFG	MODEL	SERIAL NO.	DUE DATE
270	FLUKE	5700A	6725605	12/04/1998
258	FLUKE	5725A	6585002	12/08/1998
235	GUILDLINE	6500A	59660	05/19/1998

APPROVED BY: Peter J. Stemmum

CMS

QCO

DATE: 03/17/1998

ROTHE DEVELOPMENT METROLOGY SERVICES

CALIBRATION DATA: KEITHLEY 614 ELECTROMETER

CUSTOMER: SWRT
 WO NUMBER: 64239
 SERIAL: 467374
 CUST ID: _____

DATE: 17 Mar 98
 TECH: PJS
 INST NO: 11152

CALIBRATION DATA TAKEN

INCOMING ✓
 OUTGOING ✓

CONDITION OF EQUIPMENT

IN TOLERANCE ✓
 OUT OF TOLERANCE _____

INPUT CURRENT VERIFICATION

RANGE	INPUT	MIN	READING	MAX
20 pA	NONE	-00.06	<u>00.02</u>	+00.06

DC VOLTMETER ACCURACY

RANGE	INPUT	MIN	READING	MAX
.2 V	0.0 mV	-.00002	<u>.00000</u>	+.00002
	+190 mV	+1.8983	<u>.19000</u>	+1.9017
	-190 mV	-1.8983	<u>-.19000</u>	-1.9017
2 V	+1.9 V	+1.8984	<u>1.9000</u>	+1.9016
	-1.9 V	-1.8984	<u>-1.8998</u>	-1.9016
20 V	+19 V	+18.984	<u>18.998</u>	+19.016
	-19 V	-18.984	<u>18.996</u>	-19.016

DC CURRENT ACCURACY

RANGE	INPUT	MIN	READING	MAX
200 uA	+190 uA	+189.3	<u>189.9</u>	+190.7
200 nA	+190 nA	+189.0	<u>190.2</u>	+191.0
2000 pA	+1900 pA	+1871	<u>1898</u>	+1929

RESISTANCE ACCURACY

RANGE		ACTUAL INPUT	TOLERANCE	READING
20 KΩ	(19)	<u>19.00 kΩ</u>	±11 C	<u>18.99</u>
200 KΩ		<u>190.0 kΩ</u>	±11 C	<u>189.8</u>
20 MΩ	(10)	<u>10.00 MΩ</u>	±10 C	<u>9.99</u>
20 GΩ	(10)	<u>9.98 GΩ</u>	±2 %	<u>9.97</u>

CHARGE ACCURACY

RANGE	INPUT	MIN	READING	MAX
2 nC	1.0 VDC INTO 1000 pF	0.9500	<u>.9890</u>	1.0500

SOUTHWEST RESEARCH INSTITUTE
Department of Quality Assurance
Calibration Laboratory • 522-5215

WORK ORDER

CERTIFICATE # 33579 ASSET # 001498 DATE 05 March 99

ITEM DATA:

Manufacturer Kettley Model 614
Description electrometer Serial # 467374
Accessories flex cable + 23897

ACTION REQUESTED cal

CUSTODIAN DM 20, Donell Dunn

Turned in by: _____ Phone 6090

CHARGE # 20-44057 OH Date Required _____

INSTRUMENT USED ON: (DOD/NASA) (NUCLEAR) (GLP) (SPPE) (ISO)
 OTHER _____

COPY OF CALIBRATION CERTIFICATE (Yes) (No)

NEW WORK Yes No If yes, an evaluation shall be made to verify capabilities.

By mad Date 03-05-99

Work involves proprietary/confidential information or equipment (Yes) (No)

CONDITION RECEIVED: _____ (F) Out of tolerance, repaired to specifications
_____ (G) In tolerance, minor adjustments/repairs made
 (J) In tolerance, no adjustments/repairs
_____ (K) Out of tolerance, adjusted to specifications
_____ (S) Received into system, introduced or reactivated

ACTION TAKEN: (Calibration/Repair/Parts) 03/08 Roche Dev. ST# 31123

33579

CAL ENVIRONMENT:
Temperature 72 °F Humidity 31 %RH

CALIBRATED/REPAIRED:
By Roche Dev. San Antonio, TX Cal Procedure MEP
Date 03-19-99 Accuracy MEP specs
Cal Interval 1 mos Reliability Code: 7
Next Cal due 03-19-00 Cal Time _____ Repair Time _____
Standards used (Asset#) Vendor

DATE COMPLETED 31 March 99
DATE PICKED UP 4/2/99 PICKED UP BY Donell D



CERT. NUMBER: 57104

ROTHE DEVELOPMENT, INC.
METROLOGY SERVICES DIVISION
4614 SINCLAIR RD., SAN ANTONIO, TEXAS 78222 PH:210-648-3131

CERTIFICATE OF CALIBRATION

ISSUED TO: Southwest Research Institute
6220 Culebra, Bldg. 64/Division 30
San Antonio, TX 78231
522-5460

(20) **MFG:** Keithley
MODEL: 614
NOMEN: Electrometer
S/N: 467374
CUST. ID:

CAL DATE: 03/19/1999
DUE DATE: 03/19/2000

CONTROL NO.: 103 - 11152
TECHNICIAN: 4
SPECIFICATIONS: MFG
PROCEDURE: MFG
WORK ORDER: 70786
CUSTOMER P.O.: 02127/SI341723/20-1402571
RECEIVED CONDITION: IN TOLERANCE
RETURNED CONDITION: IN TOLERANCE

CALIBRATION PERFORMED AT: RIMSD
CALIBRATION INTERVAL: 12mos.
TEMPERATURE: 72 °F
RELATIVE HUMIDITY: 31 %

DATE RECEIVED: 03/10/1999

COMMENTS:

ATTACHMENTS: CALIBRATION DATA

All Calibrations performed at Rothe Development, Inc. Metrology Services Division meet the requirements of ANSI/NC SL Z540-1-1994, ISO/IEC GUIDE 25, and ISO 10012-1, and are traceable to the National Institute of Standards and Technology. The collective uncertainty of the measurement(s) does not exceed 25% ($TUR \geq 4:1$) of the instrument specification(s) unless noted in the COMMENTS section.

TR#	MFG	MODEL	SERIAL NO.	DUE DATE
20	FLUKE	5700A/EP	4605002	03/28/1999
258	FLUKE	5725A	6585002	03/28/1999
285	GUILDLINE	6500A	59660	06/23/1999

APPROVED BY: *Arthur Stemmer*

CMS

QCO

DATE: 03/22/1999

ROTHE DEVELOPMENT METROLOGY SERVICES

CALIBRATION DATA: KEITHLEY 614 ELECTROMETER

CUSTOMER: SWRI
 WO NUMBER: 70786
 SERIAL: 467374
 CUST ID: _____

DATE: 19 Mar 99
 TECH: PJS
 INST NO: 11152

CALIBRATION DATA TAKEN

INCOMING ✓
 OUTGOING ✓

CONDITION OF EQUIPMENT

IN TOLERANCE ✓
 OUT OF TOLERANCE _____

INPUT CURRENT VERIFICATION

RANGE	INPUT	MIN	READING	MAX
20 pA	NONE	-00.06	<u>00.02</u>	+00.06

DC VOLTMETER ACCURACY

RANGE	INPUT	MIN	READING	MAX
.2 V	0.0 mV	-.00002	<u>.00000</u>	+.00002
	+190 mV	+.18983	<u>.19000</u>	+.19017
	-190 mV	-.18983	<u>.19000</u>	-.19017
2 V	+1.9 V	+1.8984	<u>1.9000</u>	+1.9016
	-1.9 V	-1.8984	<u>1.8998</u>	-1.9016
20 V	+19 V	+18.984	<u>18.998</u>	+19.016
	-19 V	-18.984	<u>18.997</u>	-19.016

DC CURRENT ACCURACY

RANGE	INPUT	MIN	READING	MAX
200 uA	+190 uA	+189.3	<u>189.9</u>	+190.7
200 nA	+190 nA	+189.0	<u>190.1</u>	+191.0
2000 pA	+1900 pA	+1871	<u>1898</u>	+1929

RESISTANCE ACCURACY

RANGE		ACTUAL INPUT	TOLERANCE	READING
20 KΩ	(19)	<u>19.00 K</u>	±11 C	<u>18.99</u>
200 KΩ		<u>190.0 K</u>	±11 C	<u>189.8</u>
20 MΩ	(10)	<u>10.00 M</u>	±10 C	<u>9.99</u>
20 GΩ	(10)	<u>9.97 G</u>	±2 %	<u>9.97</u>

CHARGE ACCURACY

RANGE	INPUT	MIN	READING	MAX
2 nC	1.0 VDC INTO 1000 pF	0.9500	<u>.9909</u>	1.0500

WORK ORDER 38593

Date Received 4/10/00

Asset No. 001438 Manufacturer KEITHLEY Model 614
Description ELECTROMETER Serial Number 467374
Accessory Received/Required TRIAx CABLE
Div/CC ID NONE Accessory to Asset No. N/A Accuracy MFG SPECS
Div/CC DIV20 Location B57 Custodian DARRELL DUNN Tel. 6090
Charge/Project No. 20.00751.006 Proprietary/Confidential N Date Required ROUTINE
Work Requested CALIBRATION
Receiving Inspection O.K.
Delivered By DARRELL DUNN Tel. 6090

WORK HISTORY

Date	Start Time	Stop Time	Notes
04/12			Rothe Dev. S.T. 3/6/95

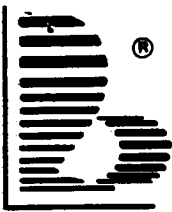
PARTS

Part Name	Part Number	Cost	Failure Description

38593

WORK SUMMARY

Failure Description _____
Repair Action _____
Cal Procedure MP Temp 13 F Hum 34 %
Tech Rothe Dev. Cal Hrs. _____ Repair Hrs. _____ Part Cost _____
Action Taken calibrated
Standards Used Vendor
Date Cal 04-21-00 Int. 12 Mo. Date Due 04-21-01 Reliability Code 8
Date Picked Up 5/21/00 Picked Up By [Signature]
workreq.rpt Rev 30 Jan 00



CERT. NUMBER:
11152:956851527

ROTHE DEVELOPMENT, INC.
METROLOGY SERVICES DIVISION
4614 SINCLAIR RD., SAN ANTONIO, TEXAS 78222 PH:210-648-3131

CERTIFICATE OF CALIBRATION

ISSUED TO: Southwest Research Institute (30) 6220 Culebra San Antonio, TX 78284	MFG: Keithley MODEL: 614 NOMEN: Electrometer S/N: 467374 CUST. ID:	CAL DATE: 4/27/2000 DUE DATE: 4/27/2001
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CONTROL NO.: 103 - 11152
 TECHNICIAN: 4
 SPECIFICATIONS: MFG
 PROCEDURE: MFG
 WORK ORDER: 002003472
 CUSTOMER P.O.: 02127/ST366595/20.00760
 RECEIVED CONDITION: IN TOLERANCE
 RETURNED CONDITION: IN TOLERANCE

CALIBRATION PERFORMED AT: RDMSD
 CALIBRATION INTERVAL: 12Mo.
 TEMPERATURE: 73.0 °F
 RELATIVE HUMIDITY: 34 %

DATE RECEIVED: 4/13/2000

COMMENTS:

ATTACHMENTS:

All Calibrations performed at Rothe Development, Inc. Metrology Services Division meet the requirements of ANSI/NC SL Z540-1-1994, ISO/IEC GUIDE 25, and ISO 10012-1, and are traceable to the National Institute of Standards and Technology. The collective uncertainty of the measurement(s) does not exceed 25% (TUR_≥4:1) of the instrument specification(s) unless noted in the COMMENTS section.

TR#	MFG	MODEL	SERIAL NO.	DUE DATE
20	FLUKE	5700A/EP	4605002	6/28/2000
258	FLUKE	5725A	6585002	6/28/2000
235	GUILDFINE	6500A	59660	10/26/2000
75	JRL	NMN	75	11/15/2000

APPROVED BY: Peter J. Stemmer CMS QCO DATE: 4/27/2000

**SOUTHWEST RESEARCH INSTITUTE
CALIBRATION LABORATORY
MEMORANDUM**

May 1, 2000

To: DARRELL DUNN DIV20 B57
From: Jim Patterson *J.P.*
Subject: Calibration by an approved supplier

Manufacturer/Model: KEITHLEY 614
Description: ELECTROMETER
Serial Number: 467374
Asset Number: 001438
Calibration Due: April 27, 2001
Remarks: ROTHE CERTIFICATE NO.: 11152:956851527.

Supplier: ROTHE DEVELOPMENT, INC., SAN ANTONIO, TX

The above item was sent to an approved supplier who is listed on the SwRI Approved Suppliers List (ASL). This supplier is qualified to supply a product or service in support of project activities that require the use of approved suppliers. Please notify Mark Romero, extension 5215, of any discrepancies with the item or calibration documentation.

Attachment(s) 1

SOUTHWEST RESEARCH INSTITUTE

Calibration Laboratory

WORK ORDER

Received by WHILL, 9/27/01 10:50:50AM

Arrived 9/27/01

Work Order **444045334**

Asset No. 001438 Manufacturer KEITHLEY

Model 614

Instrument Type/Class ELECTROMETER

Serial No. 467374

Accessory No. _____

Calibration Procedure VENDOR

Location B57

Div/Client DIV20

Custodian DARRELL DUNN

Mail Stop B57

Tel. 6090

IN4CAL

Special Instructions _____

Notify before making adjustments or repairs. Provide measurement readings

Charge/Project No. 01402.571.1.20

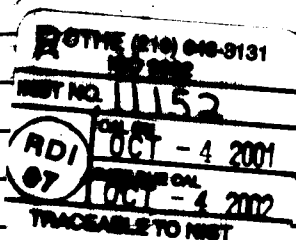
Requested By / Telephone DARRELL

The above is correct for the work requested.

WORK NOTES

Date Hours Remarks/Notes

9-28-01 _____ S.T. # 390820



Date Hours Part Name Part Number Failure Description Cost

Date	Hours	Part Name	Part Number	Failure Description	Cost

WORK SUMMARY

Failure Description _____

Repair Action _____

Calibration Procedure MFG Temp 73F Hum. 38 %

Tech Rothke Development Totals Cal Hours _____ Repair Hours _____ Parts Cost _____

Standards Used Vendor

Date Picked Up 10/11/2001

Picked Up By Darrell Dunn

444045334



CERT.

11152:1002211318

ROTHE DEVELOPMENT, INC.

METROLOGY SERVICES DIVISION

4614 SINCLAIR RD., SAN ANTONIO, TEXAS 78222 PH:210-648-3131

CERTIFICATE OF CALIBRATION

ISSUED TO: Southwest Research Institute
(30)
6220 Culebra
San Antonio, TX 78284

MFG: Keithley
MODEL: 614
NOMEN: Electrometer
S/N: 467374
CUST. ID:

CAL DATE: 10/4/2001
DUE DATE: 10/4/2002

CONTROL NO.: 103 - 11152
TECHNICIAN: 7
SPECIFICATIONS: MFG
PROCEDURE: MFG
WORK ORDER: 002015123
CUSTOMER P.O.: 01566R/ST390920/1.20.014
RECEIVED CONDITION: IN TOLERANCE
RETURNED CONDITION: IN TOLERANCE

CALIBRATION PERFORMED AT: RDMSD
CALIBRATION INTERVAL: 12Mo.
TEMPERATURE: 73.0 °F
RELATIVE HUMIDITY: 38 %

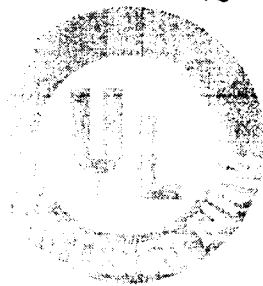
DATE RECEIVED: 10/1/2001

COMMENTS:

ATTACHMENTS:

All Calibrations performed at Rothe Development, Inc. Metrology Services Division meet the requirements of ANSI/NCSL Z540-1-1994, ISO/IEC GUIDE 25, and ISO 10012-1, and are traceable to the National Institute of Standards and Technology. The collective uncertainty of the measurement(s) does not exceed 25% (TUR_≥4:1) of the instrument specification(s) unless noted in the COMMENTS section.

TR#	MFG	MODEL	SERIAL NO.	DUE DATE
20	FLUKE	5700A/EP	4605002	12/24/2001
258	FLUKE	5725A	6585002	12/24/2001
235	GUILDLINE	6500A	59660	11/1/2001
75	JRL	NMN	75	1/22/2002



ISO 9001 CERTIFICATE NO. 48425

APPROVED BY:

Peter J. Stimmer

CMS

QCO

DATE:

10/4/2001

**SOUTHWEST RESEARCH INSTITUTE
CALIBRATION LABORATORY
MEMORANDUM**

October 9, 2001

To: DARRELL DUNN DIV20 B57

From: Walt Hill, Supervisor *WH*
Institute Calibration Laboratory

Subject: Calibration by an approved supplier

Manufacturer/Model: KEITHLEY 614

Description: ELECTROMETER

Serial Number: 467374

Asset Number: 001438

Work Order Number: 444045334

Date Calibrated: October 4, 2001

Remarks: ROTHE CERTIFICATE NO.: 11152:1002211318

Supplier: ROTHE DEVELOPMENT, INC., SAN ANTONIO, TX

The above item was sent to an approved supplier who is listed on the SwRI Approved Suppliers List (ASL). This supplier is qualified to supply a product or service in support of project activities that require the use of approved suppliers. Please notify the Institute Calibration Laboratory, extension 5215, of any discrepancies with the item or calibration documentation.

Attachment(s) 1