

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

WORK ORDER

CERTIFICATE # 24586 ASSET # 001437 DATE 18 FEB. 97

ITEM DATA:

Manufacturer Keithley Model 405  
Description auto-ranging picoammeter Serial # 509163  
Accessories \_\_\_\_\_

ACTION REQUESTED cal

CUSTODIAN DVRO, Donell Dunn

Turned in by: \_\_\_\_\_ Phone \_\_\_\_\_

CHARGE # 10-508-56 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  
\_\_\_\_\_ Calibration interval  
\_\_\_\_\_ Reliability code

24586

ACTION TAKEN: (Calibration/Repair/Parts) # 87030 to Depto 01/19/97

CAL ENVIRONMENT:  
Temperature 73 °F Humidity 36 %RH

CALIBRATED/REPAIRED:  
By Kothe Cal Procedure ME R  
Date 2/20/97 Accuracy ME R  
Cal Interval 12 Time to complete:  
Next Cal due 2/20/98 Cal 1.0 Repair \_\_\_\_\_  
Standards used (Asset#) vendor

DATE COMPLETED 2/20/97  
DATE PICKED UP 2/21/97 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

# 46915

CAL DATE: 02/20/97

DUE DATE: 02/20/98

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

(30)

MFG Keithley

MODEL 485

SERIAL # 509163

TYPE DMM

RECEIVED IN-SPECS   
OUT-OF-SPECS

CONTROL: 103 - 13096

TECHNICIAN #: 4

SPECIFICATIONS: MFG

PROCEDURE: MFG

WORK ORDER #: 58007

CUSTOMER PO #: 02127/ST297038/20-5708561

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 36%

### Test Report Number and Calibration Standards Used

Ref #	Model #	Mfgr	Serial #	Description	Cal Date	Int	Cal Due
TR 20	5700A	FLUKE	4605002	CALIBRATOR	12/03/96	3	03/03/97
TR 75	NMN	JRL	75	RESISTANCE BOX	08/30/96	12	08/30/97
TR 235	6500A	GUILDLINE	59660	TERAOhMETER	09/17/96	12	09/17/97

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

INSPECTED BY Jose A Mendez  
COMMENTS:

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

ROTHE DEVELOPMENT METROLOGY SERVICES

CALIBRATION DATA: KEITHLEY 485 AUTORANGING PICOAMMETER

CUSTOMER: SWPT  
 WO NUMBER: 58007  
 SERIAL: 509163  
 CUST ID: \_\_\_\_\_

DATE: 20 Feb 97  
 TECH: PJS  
 INST NO: 13096

CALIBRATION DATA TAKEN

INCOMING ✓  
 OUTGOING ✓

CONDITION OF EQUIPMENT

IN TOLERANCE ✓  
 OUT OF TOLERANCE \_\_\_\_\_

CURRENT ACCURACY

RANGE	INPUT	MIN	READING	MAX
2 mA	1.9 mA	1.8980	<u>1.9000</u>	1.9020
200 uA	190 uA	189.80	<u>190.01</u>	190.20
20 uA	19 uA	18.980	<u>19.000</u>	19.020
2 uA	1.9 uA	1.8971	<u>1.9001</u>	1.9029
200 nA	190 nA	189.61	<u>190.02</u>	190.39
20 nA	19 nA	18.923	<u>19.000</u>	19.077
2 nA	1.9 nA	1.8920	<u>1.9000</u>	1.9080



# 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 - 13096

WORK ORDER # 58007

CUSTOMER

RECEIVED FROM Southwest Research Institute (30) DATE 02/19/97

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/ST297038/20-5708561

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

ITEM

MFG Keithley

MODEL 485

SERIAL # 509163

TYPE DMM

ACCES. RCVD. Lead

- REPAIR
- OPERATIONAL CHECK
- CALIBRATION

CALIBRATION DATE 20 Feb 97  
DATE DUE 20 Feb 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. #
					PSS	
					REPAIR LABOR HRS.	SERVICE CODE
						J
					PARTS TOTAL	
					REPAIR LABOR	
					SHIPPING	
					TEAR DOWN CHARGE	
					CALIBRATION	80.00
					TAX	
					TOTAL	80.00

THIS IS NOT AN INVOICE

TR #'s 20, 75, 235

### COMMENTS

#### WORK PERFORMED:

Cal Data Taken -

CAL

TEMP 73 °F

SPECS: (MFG) RDI

R.H. 36 %

PROCEDURE: (MFG) RDI OTHER

RDI 2002

SHIP VIA: \_\_\_\_\_ DATE: \_\_\_\_\_

RECEIVED BY: \_\_\_\_\_



Southwest Research Institute  
6220 Culebra Road  
San Antonio, TX 78238  
Department of Quality Assurance  
Calibration Laboratory

## Certificate of Calibration

21 February 1997

Issued to: DARRELL DUNN                      DIV20                      B57  
Manufacturer/Model: KEITHLEY 485  
Description: AUTORANGING PICOAMMETER  
Serial Number: 509163  
Asset Number: 001437

### Environmental Conditions

Temperature: 73.0 Deg. F                      Humidity: 36%

### Calibration Information

Calibration was in accordance with requirements of MIL-STD-45662A and ANSI/NCSL Z540-1-1994. Measurements are traceable to the National Institute of Standards and Technology (NIST). This report may not be reproduced except in full without written approval of the originator. Inspection and test data are on file and available for inspection.

Calibration Date: 20 Feb 97                      Calibration Procedure: MFGR

Interval: 12 months                      Accuracy: MFGR SPECS

Next Calibration Due: 20 Feb 98                      Received: In Tolerance

Remarks: CALIBRATED BY ROTHE DEVELOPMENT, SAN ANTONIO  
ROTHE CERTIFICATE # 46915

Certificate # 24386

Signed: 

LAST PAGE OF REPORT  
Total Pages Printed: 1





CERT. NUMBER: 51781

**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) MFG: Keithley  
6220 Culebra, Bldg. 64/Division 30 MODEL: 485  
San Antonio, TX 78284 NOMEN: DMM  
522-5460 S/N: 509163  
CUST. ID:

CAL DATE: 03/05/1998  
DUE DATE: 03/05/1999

CONTROL NO.: 103 - 13096  
TECHNICIAN: 4  
SPECIFICATIONS: MFG  
PROCEDURE: MFG  
WORK ORDER: 64106  
CUSTOMER P.O.: 02127/ST318686/20-1402571  
RECEIVED CONDITION: IN TOLERANCE  
RETURNED CONDITION: IN TOLERANCE

CALIBRATION PERFORMED AT: RDMSD  
CALIBRATION INTERVAL: 12mos.  
TEMPERATURE: 73 °F  
RELATIVE HUMIDITY: 31 %  
DATE RECEIVED: 02/23/1998

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
270	FLUKE	5700A	6725605	12/04/1998
75	J&L	NMN	75	12/11/1998
235	GUILDLINE	6500A	59660	05/19/1998

APPROVED BY: \_\_\_\_\_

*Peter J. Atkinson*

CMS

QCO

DATE: 03/05/1998

ROTHE DEVELOPMENT METROLOGY SERVICES

CALIBRATION DATA: KEITHLEY 485 AUTORANGING PICOAMMETER

CUSTOMER: SWRTI  
 WO NUMBER: 64106  
 SERIAL: 509163  
 CUST ID: \_\_\_\_\_

DATE: 5 Mar 98  
 TECH: PJS  
 INST NO: 13096

CALIBRATION DATA TAKEN

INCOMING ✓  
 OUTGOING ✓

CONDITION OF EQUIPMENT

IN TOLERANCE ✓  
 OUT OF TOLERANCE \_\_\_\_\_

CURRENT ACCURACY

RANGE	INPUT	MIN	READING	MAX
2 mA	1.9 mA	1.8980	<u>1.9000</u>	1.9020
200 uA	190 uA	189.80	<u>190.00</u>	190.20
20 uA	19 uA	18.980	<u>19.001</u>	19.020
2 uA	1.9 uA	1.8971	<u>1.9001</u>	1.9029
200 nA	190 nA	189.61	<u>190.00</u>	190.39
20 nA	19 nA	18.923	<u>19.000</u>	19.077
2 nA	1.9 nA	1.8920	<u>1.9002</u>	1.9080



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

WORK ORDER

CERTIFICATE # 33578 ASSET # 001137 DATE 05 MARCH 99

ITEM DATA:

Manufacturer Kathlay Model 485  
Description autoranging pammeter Serial # 509163  
Accessories probe (two clamps @ end)

ACTION REQUESTED cal

CUSTODIAN Dr. D. Donnell Dunn

Turned in by: \_\_\_\_\_ Phone 6090

CHARGE # 20-1468-571 off 03/2 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 MMI 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 Str 31123

33578

CAL ENVIRONMENT:

Temperature 72 °F Humidity 31 %RH

CALIBRATED/REPAIRED:

By Roche Dev. San Antonio, TX Cal Procedure MEG

Date 03-19-99 Accuracy MEG spec

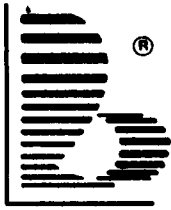
Cal Interval 12mos Reliability Code: B

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 Donnell Dunn



CERT. NUMBER: 57195

**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 78294  
522-5460

(30) **MFG:** Keithley  
**MODEL:** 485  
**NOMEN:** DMM  
**S/N:** 509163  
**CUST. ID:**

**CAL DATE:** 03/10/1999  
**DUE DATE:** 03/19/2000

**CONTROL NO.:** 103 - 13096  
**TECHNICIAN:** 4  
**SPECIFICATIONS:** MFG  
**PROCEDURE:** MFG  
**WORK ORDER:** 70787  
**CUSTOMER P.O.:** 02127/5T341723/20-1402571  
**RECEIVED CONDITION:** IN TOLERANCE  
**RETURNED CONDITION:** IN TOLERANCE

**CALIBRATION PERFORMED AT:** RUMSO  
**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/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<sub>≥</sub>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
75	JPL	NMN	75	11/19/1999
235	GUILDLINE	6500A	59660	06/23/1999

**APPROVED BY:** *Actu Stemmer*

CMS

QCO

**DATE:** 03/22/1999

ROTHE DEVELOPMENT METROLOGY SERVICES

CALIBRATION DATA: KEITHLEY 485 AUTORANGING PICOAMMETER

CUSTOMER: SwRI  
 WO NUMBER: 70787  
 SERIAL: 509163  
 CUST ID: \_\_\_\_\_

DATE: 19 Mar 99  
 TECH: PJS  
 INST NO: 13096

CALIBRATION DATA TAKEN

INCOMING ✓  
 OUTGOING ✓

CONDITION OF EQUIPMENT

IN TOLERANCE ✓  
 OUT OF TOLERANCE \_\_\_\_\_

CURRENT ACCURACY

RANGE	INPUT	MIN	READING	MAX
2 mA	1.9 mA	1.8980	<u>1.9001</u>	1.9020
200 uA	190 uA	189.80	<u>190.01</u>	190.20
20 uA	19 uA	18.980	<u>19.001</u>	19.020
2 uA	1.9 uA	1.8971	<u>1.9001</u>	1.9029
200 nA	190 nA	189.61	<u>190.00</u>	190.39
20 nA	19 nA	18.923	<u>19.000</u>	19.077
2 nA	1.9 nA	1.8920	<u>1.8998</u>	1.9080

# WORK ORDER 38592

Date Received 4/10/00

Asset No. 001437 Manufacturer KEITHLEY Model 485  
Description AUTORANGING PICOAMMETER Serial Number 509163  
Accessory Received/Required CABLE W/ TWO CLAMPS.  
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			Keithley Dev. S.T. 360595

### PARTS

Part Name	Part Number	Cost	Failure Description

### WORK SUMMARY

Failure Description \_\_\_\_\_  
Repair Action \_\_\_\_\_  
Cal Procedure MA Temp 74 F Hum 33 %  
Tech Keithley Dev. Cal Hrs. \_\_\_\_\_ Repair Hrs. \_\_\_\_\_ Part Cost \_\_\_\_\_  
Action Taken calibrated  
Standards Used Vendor  
Date Cal 04-27-00 Int. 12 Mo. Date Due 04-27-01 Reliability Code 9  
Date Picked Up 5/2/00 Picked Up By [Signature]

38592

**SOUTHWEST RESEARCH INSTITUTE  
CALIBRATION LABORATORY  
MEMORANDUM**

**May 1, 2000**

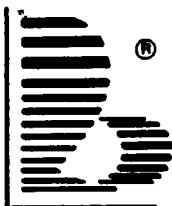
**To:** DARRELL DUNN, DIV20 B57  
**From:** Jim Patterson *JPA*  
**Subject:** Calibration by an approved supplier

**Manufacturer/Model:** KEITHLEY 485  
**Description:** AUTORANGING PICOAMMETER  
**Serial Number:** 509163  
**Asset Number:** 001437  
**Calibration Due:** April 27, 2001  
**Remarks:** ROTHE CERTIFICATE NO.: 13096:956851471.

**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



CERT. NUMBER:  
13096:956851471

**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 MFG: Keithley  
(30) MODEL: 485 CAL DATE: 4/27/2000  
6220 Culebra NOMEN: PICOAMMETER DUE DATE: 4/27/2001  
San Antonio, TX 78284 S/N: 509163  
CUST. ID:

CONTROL NO.: 103 - 13096  
TECHNICIAN: 4  
SPECIFICATIONS: MFG  
PROCEDURE: MFG  
WORK ORDER: 002003471  
CUSTOMER P.O.: 02127/ST366595/20.00760  
RECEIVED CONDITION: IN TOLERANCE  
RETURNED CONDITION: IN TOLERANCE

CALIBRATION PERFORMED AT: RDMSD  
CALIBRATION INTERVAL: 12Mo.  
TEMPERATURE: 74.0 °F  
RELATIVE HUMIDITY: 33 %

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% ( $TUR \geq 4:1$ ) of the instrument specification(s) unless noted in the COMMENTS section.

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

APPROVED BY: *Arthur J. Stemann*

CMS

QCO

DATE:

4/27/2000

RDMSD 1001  
08/97

This certificate may not be reproduced, except in full, without written approval of Rothe Development, Inc. Metrology Services Division.

# SOUTHWEST RESEARCH INSTITUTE

## Calibration Laboratory

### WORK ORDER

Processed by RCRUZ at 2:38:38PM on 4/26/01

||||| ||||| ||||| ||||| ||||| ||||| ||||| |||||

**Work Order 444043357**

Arrived 4/26/01

Asset No. 001437 Manufacturer KEITHLEY

Model 485

Instrument Type/Class PICOAMMETER

Serial No. 509163

Accessory No.

Calibration Procedure MFG

Location B57

Div/Client DIV20

Custodian DARRELL DUNN

Mail Stop B57

Tel. 6090

Charge/Project No. 20.00751.006

Delivered By / Telephone DARRELL DUNN

**IN4CAL**

Special Instructions \_\_\_\_\_

### WORK NOTES

Date	Hours	Remarks/Notes
<u>5-1-01</u>		<u>Rothe P.O.C. Loric Cal # 88<sup>02</sup> S.T. # 380583</u>

ROTHE 610-610-6131  
ISO 9001  
INST. NO. 13096  
ADI MAY -7 2001  
07 DATE RECAL. MAY -7 2002  
TRACEABLE TO NIST

**444043357**

### REPAIR PARTS

Date	Hours	Part Name	Part Number	Failure Description

### WORK SUMMARY

Failure Description NA

Repair Action \_\_\_\_\_

Calibration Procedure MFG Temp 73 F Hum. 36 %

Tech Rothe Totals Cal Hours \_\_\_\_\_ Repair Hours \_\_\_\_\_ Parts Cost \_\_\_\_\_

Standards Used Vendors

Date Picked Up 5/18/2001

Picked Up By [Signature]

CERT. NUMBER:  
13096:989233700

# 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 MFG: Keithley  
(30) MODEL: 485 CAL DATE: 5/7/2001  
6220 Culebra NOMEN: PICOAMMETER DUE DATE: 5/7/2002  
San Antonio, TX 78284 S/N: 509163  
CUST. ID:

CONTROL NO.: 103 - 13096  
TECHNICIAN: 7  
SPECIFICATIONS: MFG  
PROCEDURE: MFG  
WORK ORDER: 002012180  
CUSTOMER P.O.: 01571R/ST380583/20.00860  
RECEIVED CONDITION: IN TOLERANCE  
RETURNED CONDITION: IN TOLERANCE

CALIBRATION PERFORMED AT: RDMSD  
CALIBRATION INTERVAL: 12Mo.  
TEMPERATURE: 73.0 °F  
RELATIVE HUMIDITY: 36 %  
DATE RECEIVED: 5/3/2001

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% ( $TUR \geq 4:1$ ) of the instrument specification(s) unless noted in the COMMENTS section.

TR#	MFG	MODEL	SERIAL NO.	DUE DATE
20	FLUKE	5700A/EP	4605002	6/21/2001
258	FLUKE	5725A	6585002	6/21/2001
75	JRL	NMN	75	1/22/2002
235	GUILDLINE	6500A	59660	11/1/2001

APPROVED BY:

*Peter J. Stammers*

CMS

QCO

DATE:

5/8/2001



**SOUTHWEST RESEARCH INSTITUTE  
CALIBRATION LABORATORY  
MEMORANDUM**

**May 10, 2001**

**To:** DARRELL DUNN DIV20 B57  
**From:** Walt Hill, Supervisor *WH*  
Institute Calibration Laboratory  
**Subject:** Calibration by an approved supplier

**Manufacturer/Model:** KEITHLEY 485  
**Description:** PICOAMMETER  
**Serial Number:** 509163  
**Asset Number:** 001437  
**Work Order Number:** 444043357  
**Date Calibrated:** May 7, 2001  
**Remarks:** ROTHE CERT # 13096:989233700

**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

# SOUTHWEST RESEARCH INSTITUTE

## Calibration Laboratory

### WORK ORDER

Received by RCRUZ, 5/14/02 10:27:16AM

Arrived 5/14/02

Work Order **444048536**

Asset No. 001437 Manufacturer KEITHLEY

Model 485

Equipment Type PICOAMMETER

Serial No. 509163

Accessory No. \_\_\_\_\_

Interval 12 M

Calibration Procedure Send to Rothe

Location B57

Div/Client DIV20

Custodian DARRELL DUNN

Mail Stop B57

Tel 6090

**IN LINE**

Special Instructions \_\_\_\_\_

Notify before adjustments or repairs. ( ) Provide data with certificate (  ) Certificate Typ \_\_\_\_\_

Charge/Project No. 00751.006 1.20

Requester / Telephone DARRELL DUNN X6090

This information is correct for the work requested. *Darrell Dunn*

### WORK NOTES

Date Hours Remarks/Notes

5/17/02 \_\_\_\_\_ Sent to Rothe

Date Hours Part Name Part Number Failure Descripti

ROTHE (214) 948-3131  
NET NO. 13096  
RDI JUN - 4 2002  
04 DATE CAL JUN - 4 2003 OS  
TRACEABLE TO NIST

**444048536**

### WORK SUMMARY

Failure Description *M/A*

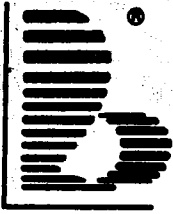
Repair Action \_\_\_\_\_

Tech Rothe Cal Hrs. \_\_\_\_\_ Repair Hrs \_\_\_\_\_ Parts Cost \_\_\_\_\_ Temp 73 F Hum. 38 %

Standards Used Verdo

Date Picked Up 6/24/02

Picked Up By *Darrell Dunn*



CERT. NUMBER:  
13096:1023200795

**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: 485  
NOMEN: PICOAMMETER  
S/N: 509163  
CUST. ID: 1437

CAL DATE: 6/4/2002  
DUE DATE: 6/4/2003

CONTROL NO.: 103 - 13096  
TECHNICIAN: 4  
SPECIFICATIONS: MFG  
PROCEDURE: MFG  
WORK ORDER: 002019955  
CUSTOMER P.O.: 01571R/ST399493/1.20  
RECEIVED CONDITION: IN TOLERANCE  
RETURNED CONDITION: IN TOLERANCE

CALIBRATION PERFORMED AT: RDMSD  
CALIBRATION INTERVAL: 12 Mo.  
TEMPERATURE: 73.0 °F  
RELATIVE HUMIDITY: 39 %

DATE RECEIVED: 5/20/2002

COMMENTS:

ATTACHMENTS: CALIBRATION DATA 1 SHEET

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<sub>≥</sub>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	7/1/2002
258	FLUKE	5725A	6585002	7/1/2002
75	JRL	NMN	75	1/9/2003
235	GUILDLINE	6500A	59660	11/14/2002

APPROVED BY: Peter J. Stemann

CMS

QCO

DATE

6/4/2002

ROTHE DEVELOPMENT METROLOGY SERVICES

CALIBRATION DATA: KEITHLEY 485 AUTORANGING PICOAMMETER

CUSTOMER: SWRI  
 WO NUMBER: 002019955  
 SERIAL: 509163  
 CUST ID: 1437

DATE: 4 Jun 02  
 TECH: PIS  
 INST NO: 13096

CALIBRATION DATA TAKEN

INCOMING ✓  
 OUTGOING ✓

CONDITION OF EQUIPMENT

IN TOLERANCE ✓  
 OUT OF TOLERANCE         

CURRENT ACCURACY

RANGE	INPUT	MIN	READING	MAX
2 mA	1.9 mA	1.8980	<u>1.9001</u>	1.9020
200 uA	190 uA	189.80	<u>190.02</u>	190.20
20 uA	19 uA	18.980	<u>19.001</u>	19.020
2 uA	1.9 uA	1.8971	<u>1.9002</u>	1.9029
200 nA	190 nA	189.61	<u>189.99</u>	190.39
20 nA	19 nA	18.923	<u>18.999</u>	19.077
2 nA	1.9 nA	1.8920	<u>1.9006</u>	1.9080

**SOUTHWEST RESEARCH INSTITUTE  
CALIBRATION LABORATORY  
MEMORANDUM**

**June 7, 2002**

**To:** DARRELL DUNN DIV20 B57

**From:** Walt Hill, Metrology Group Leader  
Institute Calibration Laboratory

**Subject:** Status of Calibration Supplier

**Manufacturer/Model:** KEITHLEY 485

**Description:** PICOAMMETER

**Serial Number:** 509163

**Asset Number:** 001437

**Work Order Number:** 444048536

**Date Calibrated:** June 4, 2002

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

**Remarks:** Rothe Cert # 13096:1023200795

- Supplier is on the Approved Suppliers List (ASL) and is accredited.
- Supplier is on the Approved Suppliers List (ASL) but is not accredited.
- There is no known accredited supplier at this time.
- Supplier is not on the Approved Suppliers List (ASL). Please contact Don Dunavant at ext. 2942 if you wish to add the supplier to the ASL.

Please notify the Institute Calibration Laboratory, extension 5215, of any discrepancies with the item or calibration documentation.

Attachment(s) 2