

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

WORK ORDER

CERTIFICATE # 24749 ASSET # 05352 DATE 18 Mar 97

ITEM DATA:

Manufacturer Orion Model EA 92c
Description expandable analyzer Serial # 7V64A
Accessories _____

ACTION REQUESTED cal

CUSTODIAN Dr. W. David Cam

Turned in by: _____ Phone for

CHARGE # 20-5705 561 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

ACTION TAKEN: (Calibration/Repair/Parts) cal

CAL ENVIRONMENT:
Temperature 74 °F Humidity 48 %RH

CALIBRATED/REPAIRED:
By Brown Cal Procedure 5352 (MFG)
Date 2 APR 97 Accuracy _____
Cal Interval 12 Time to complete:
Next Cal due 2 APR 98 Cal 2 Repair _____
Standards used (Asset#) _____

DATE COMPLETED 2 APR 97
DATE PICKED UP 4/14/97 PICKED UP BY [Signature]

24749

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

WORK ORDER

CERTIFICATE # 28771 ASSET # 003352 DATE 25 Feb 98

ITEM DATA:

Manufacturer Orion Model EA920
Description man Analyzer Serial # 4V64A
Accessories _____

ACTION REQUESTED Cal

CUSTODIAN Div 70, Donnell Dunn

Turned in by: _____ Phone 6070

CHARGE # 20-1402-571 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) _____

CAL ENVIRONMENT:
Temperature 72 °F Humidity 32 %RH

CALIBRATED/REPAIRED:
By (K. Hughes) Cal Procedure CLCP-PH-001
Date 27 Feb 98 Accuracy MFCR
Cal Interval 12 Reliability Code: 1
Next Cal due 27 Feb 98 Cal Time 1.5 Repair Time _____
Standards used (Asset#) 182

DATE COMPLETED 27 Feb 98
DATE PICKED UP 3/9/98 PICKED UP BY Donnell Dunn

28771

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

WORK ORDER

CERTIFICATE # 33575 ASSET # 005352 DATE 05 MARCH 99

ITEM DATA:

Manufacturer Orion Model EA 970
Description expandable ion Analyser Serial # TU 04A
Accessories _____

ACTION REQUESTED Cal

CUSTODIAN Div. 20, Carroll Dunn

Turned in by: _____ Phone 1040

CHARGE # 20-4402-591 OH 03/12 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 MAR1 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) Limited cal - mw volts only

33575

CAL ENVIRONMENT:
Temperature 73 °F Humidity 40 %RH

CALIBRATED/REPAIRED:
By V. Minter Cal Procedure CLCR PH-001
Date 24 MAR 99 Accuracy Mfg
Cal Interval 12 Reliability Code: 2
Next Cal due 24 MAR 00 Cal Time 1.5 Repair Time _____
Standards used (Asset#) 6413

DATE COMPLETED 24 MAR 99
DATE PICKED UP 3/21/99 PICKED UP BY [Signature]

CALIBRATION CHECK FORM

Date Calibrated 24 MAR 99 Work Order 33875
 Technician V Morales
 Unit Under Test pH Meter
 Manufacturer Orion Model 290A/520A/720A/920A SN T064A ASN 5352

STEP	FUNCTION OR RANGE	APPLIED	TOLERANCE	MEASURED VALUES		P/F
			MIN - MAX	AS FOUND	RELEASED	
1	Absolute Millivolts					
	Channel 1	-1500.0 mV	-1499.2 mV to -1500.8 mV	-1499.7mV		Pass
		-1000.0 mV	-999.5 mV to -1000.5 mV	-999.8mV		
		-500.0 mV	-499.7 mV to -500.3 mV	-499.9mV		
		000.0 mV	-000.2 mV to +000.2 mV	0.0mV		
		+500.0 mV	499.7 mV to 500.3 mV	499.8mV		
		+1000.0 mV	999.5 mV to 1000.5 mV	999.6mV		
		+1500.0 mV	1499.2 mV to 1500.8 mV	1499.5mV		
	Channel 2	-1500.0 mV	-1499.2 mV to -1500.8 mV	-1500.1mV		
		-1000.0 mV	-999.5 mV to -1000.5 mV	-999.9mV		
		-500.0 mV	-499.7 mV to -500.3 mV	-500.2mV		
		000.0 mV	-000.2 mV to +000.2 mV	-.2mV		
		+500.0 mV	499.7 mV to 500.3 mV	499.7mV		
		+1000.0 mV	999.5 mV to 1000.5 mV	999.5mV		
		+1500.0 mV	1499.2 mV to 1500.8 mV	1499.4mV		
2	Relative Millivolts					
	Channel 1	1500 mV	1499.1 mV to 1500.9 mV	1499.8mV		V
	Channel 2	1500 mV	1499.1 mV to 1500.9 mV	1499.4mV		

WORK ORDER 39372

Date Received 6/7/00

Asset No. 005352 Manufacturer ORION Model EA 920
Description EXPANDABLE IONANALYZER Serial Number TV64A
Accessory Received/Required NONE
Div/CC ID NONE Accessory to Asset No. N/A
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 MARGARET Tel. 6090

WORK HISTORY

Date	Start Time	Stop Time	Notes

PARTS

Part Name	Part Number	Cost	Failure Description

WORK SUMMARY

Failure Description _____
Repair Action _____
Cal Procedure CL-79, 6/99 Temp 74 F Hum 40 %
Tech V. Neal Cal Hrs. 10 Repair Hrs. _____ Part Cost _____
Action Taken Calibrate
Standards Used 182
Date Cal 13 June 01 Int. 12 Mo. Date Due 13 June 01 Reliability Code 3
Date Picked Up 6/28/2000 Picked Up By Melissa Nye
workreq.rpt Rev 30 Jan 00

39372



Southwest Research Institute
6220 Culebra Road
San Antonio, TX 78238
(210) 522-5215
Department of Quality Assurance
Calibration Laboratory

Accredited



Certificate #
0972-01

Certificate of Calibration

13 June 2000

Issued to: DARRELL DUNN DIV20 B57
Manufacturer/Model: ORION EA 920
Description: EXPANDABLE IONANALYZER
Serial Number: TV64A
Asset Number: 005352

This certifies the above item was calibrated in compliance with MIL-STD-45662A and ANSI/NC SL Z540-1-1994. The results of this calibration relate only to the individual item as described above. Standards used in this calibration, described in the referenced calibration procedure with associated uncertainties or tolerances, are traceable to the National Institute of Standards and Technology (NIST). Supporting documentation relative to traceability is on file and available for examination upon request. This certificate is not to be reproduced, except in full, without the written approval of the Southwest Research Institute Department of Quality Assurance Calibration Laboratory.

This laboratory is accredited by the American Association for Laboratory Accreditation (A2LA) and the results of this calibration certificate were determined in accordance with the terms of accreditation unless stated otherwise below.

The uncertainty of the calibration was sufficient to determine that the item met the manufacturer's published specifications unless stated otherwise below.

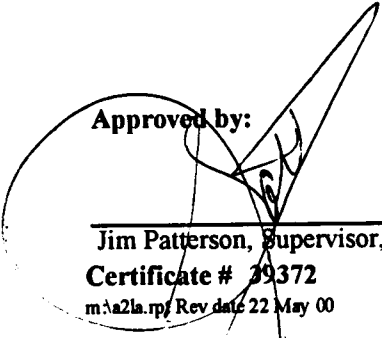
Ambient Conditions: Temperature: 74.0 Degrees Fahrenheit Humidity: 40 % RH

Calibration Date: 13 Jun 00 **Calibration Procedure:** CL-79, 6/99

Condition as Received: In Tolerance

Remarks: FOR MV USE ONLY

Approved by:



Jim Patterson, Supervisor, or Walt Hill, Metrologist

Certificate # 39372

m:\a2la.rp/Rev date 22 May 00

Measurements performed by:



Vince Morales, Technician

Page 1 of 1

SOUTHWEST RESEARCH INSTITUTE

Calibration Laboratory

WORK ORDER

Processed by RCRUZ at 3:14:42PM on 7/20/01

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

Work Order 444044498

Arrived 7/20/01

Asset No. 005352 Manufacturer ORION

Model EA 920

Instrument Type/Class EXPANDABLE IONANALYZER

Serial No. TV64A

Accessory No. Calibration Procedure CL-79, 6/99

Location B57

Div/Client DIV20

Custodian DARRELL DUNN

Mail Stop B57

Tel. 6090

Charge/Project No. 00751.006

Delivered By / Telephone

IN4CAL

Special Instructions _____

WORK NOTES

SWR Cal-Lab By: vm
CAL: Jun 13, 99 DUE: Jun 13, 01
AN: 005352 SN: TV64A
LIMITED: CAL MV USE ONLY

Date	Hours	Remarks/Notes
		<u>limited cal : MV use only.</u>

REPAIR PARTS

Date	Hours	Part Name	Part Number	Failure Description	Cost

44498

WORK SUMMARY

Failure Description _____

Repair Action _____

Calibration Procedure CL-79, TUNE 99 Temp 72 F Hum. 38 %

Tech Wes Anthony Remora Totals Cal Hours 1.0 Repair Hours _____ Parts Cost _____

Standards Used 102

Date Picked Up 7/31/01

Picked Up By [Signature]



Southwest Research Institute
6220 Culebra Road
San Antonio, TX 78238
(210) 522-5215
Department of Quality Assurance
Calibration Laboratory



Certificate #
0972-01

Certificate of Calibration

23 July 2001

Issued to: DARRELL DUNN DIV20 B57
Manufacturer/Model: ORION EA 920
Description: EXPANDABLE IONANALYZER
Serial Number: TV64A
Asset Number: 005352
Work Order Number: 444044498

This certifies the above item was calibrated in compliance with MIL-STD-45662A and ANSI/NC SL Z540-1-1994. The results of this calibration relate only to the individual item as described above. Standards used in this calibration, described in the referenced calibration procedure with associated uncertainties or tolerances, are traceable to the National Institute of Standards and Technology (NIST). Supporting documentation relative to traceability is on file and available for examination upon request. This certificate is not to be reproduced, except in full, without the written approval of the Southwest Research Institute Department of Quality Assurance Calibration Laboratory.

This laboratory is accredited by the American Association for Laboratory Accreditation (A2LA) and the results of this calibration certificate were determined in accordance with the terms of accreditation unless stated otherwise below.

The uncertainty of the calibration was sufficient to determine that the item met the manufacturer's published specifications unless stated otherwise below.

Ambient Conditions: Temperature: 72.0 Degrees Fahrenheit Humidity: 38 % RH

Calibration Date: 23 Jul 01 **Calibration Procedure:** CL-79, 6/99

Condition as Received: LIMITED CALIBRATION

Condition as Released: LIMITED CALIBRATION

Remarks: LIMITED CALIBRATION: CALIBRATE MILLIVOLT USE ONLY.

Approved by:

Walt Hill, Supervisor
Institute Calibration Laboratory

Measurements performed by:

Mark Romero, Technician

SOUTHWEST RESEARCH INSTITUTE

Calibration Laboratory

WORK ORDER

Received by AANDERSON, 7/3/02 10:42:34AM

Arrived 7/3/02

Work Order **444049294**

Asset No. 005352 Manufacturer ORION

Model EA 920

Equipment Type EXPANDABLE IONANALYZER

Serial No. TV64A

Accessory No.

Interval 12 M

Calibration Procedure CL-79, 6/99

Location B57

Div/Client DIV20

Custodian DARRELL DUNN

Mail Stop B57

Tel 6090

IN LINE

Special Instructions LIMITED: MV USE ONLY.

Notify before adjustments or repairs. () Provide data with certificate () Certificate Type _____

Charge/Project No. 00751.006 1.20

Requester / Telephone _____

This information is correct for the work requested.

WORK NOTES

Date	Hours	Remarks/Notes
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

Date	Hours	Part Name	Part Number	Failure Description	Cost
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____

WORK SUMMARY

Failure Description _____

Repair Action _____

Tech 8216 Cal Hrs. 1 Repair Hrs _____ Parts Cost _____ Temp 72 F Hum. 41 %

Standards Used 182

Date Picked Up 7/10/2002

Picked Up By Darrell Dunn

444049294

Southwest Research Institute
Calibration laboratory
Calibration Sheet.

Found/Left

Work Order:	444049294	Mfr.	Orion	Technician	8216
Asset No.	005352	Model	720A and EA920	Procedure	CL-79 7/99
Serial No.	TV64A	Type.	pH Meter	Cal Date.	10-Jul-02
Remarks:					
(1) The Difference is equal to TI reading - Test Point reading. (2) If no value is listed the uncertainty is >4/1 The results can be Pass, Fail, or if blank "not determinable". If "not determinable" it is up to the end user to determine if results meet their needs.					

Function/Range	Test Point	TI Reading	Difference (1)	Test Limits+/-	Uncertainty (2)	Results
m Volts	m Volts	m Volts	m Volts	m Volts	m Volts	
Input 1	0.0	0.0	0.0	0.5	0.0	Pass
	1000.0	999.6	-0.4	1.0	0.0	Pass
	-1000.0	-999.8	0.2	1.0	0.0	Pass

Function/Range	Test Point	TI Reading	Difference (1)	Test Limits+/-	Uncertainty (2)	Results
m Volts	m Volts	m Volts	m Volts	m Volts	m Volts	
Input 2	0.0	-0.2	-0.2	0.5	0.0	Pass
	1000.0	999.5	-0.5	1.0	0.0	Pass
	-1000.0	-999.9	0.1	1.0	0.0	Pass



Southwest Research Institute
6220 Culebra Road
San Antonio, TX 78238
(210) 522-5215
Department of Quality Assurance
Calibration Laboratory

Certificate of Calibration

10 July 2002

Issued to: DARRELL DUNN DIV20 B57
Manufacturer/Model: ORION EA 920
Description: EXPANDABLE IONANALYZER
Serial Number: TV64A
Asset Number: 005352
Work Order Number: 444049294

This certifies the above item was calibrated in compliance with MIL-STD-45662A and ANSI/NCSL Z540-1-1994. Standards used in this calibration, described in the referenced calibration procedure with associated uncertainties or tolerances, are traceable to the National Institute of Standards and Technology (NIST). Supporting documentation relative to traceability is on file and is available for examination upon request. This certificate is not to be reproduced, except in full, without the written approval of the Southwest Research Institute Department of Quality Assurance Calibration Laboratory.

The uncertainty of the calibration was sufficient to determine that the item met the manufacturer's published specifications unless stated otherwise below.

Ambient Conditions: Temperature: 72.0 Degrees Fahrenheit Humidity: 41 % RH


Calibration Date: 10 Jul 02 Calibration Procedure: CL-79, 6/99

Condition as Received: LIMITED CALIBRATION

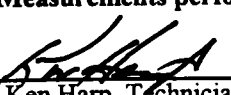
Condition as Returned: LIMITED CALIBRATION

Remarks: LIMITED CALIBRATION: MILLIVOLT USE ONLY.

Approved by:


Walt Hill, Metrology Group Leader
Institute Calibration Laboratory

Measurements performed by:


Ken Harp, Technician