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

CERTIFICATE # 24/49 ASSET # 05552 DATE 18 1442 9-7
ITEM DATA:
Manufacturer Wight 1 Model #A PC
Description Andrewap Serial # 7 V6411
Accessories 0-1
ACTION REQUESTED
CUSTODIAN DO LO LA
Turned in by: Phone
CHARGE # Date Required
INSTRUMENT USED ON: NUCLEAR DOD NASA GLP SPPE
☐ OTHER
COPY OF CALIBRATION CERTIFICATE TYPES 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) Lafration
CAL ENVIRONMENT:
Temperature
CALIBRATED/REPAIRED: By Cal Procedure 535 \(\text{2} \) (MFGR)
By Cal Procedure 5352 (MFGR) Date Z APL 97
Cal Interval Time to complete:
Next Cal due Cal Repair
Standards used (Asset#)
DATE COMPLETED Z APR97
DATE PICKED UP 4/4/97 PICKED UP BY
SwRI Form QA-169-2

WORK ORDER HISTORY

DATE	START STOP	CAL	REP	REMARKS:
INA		レ	/	parcel on for worning
	•			
-				
		-	<u> </u>	
TOTAL C	AL/REPAIR		-	TOTAL HOURS

١			
LIBRA	ATION	CHECK	FORM

Date Calibrated	Owh-	_Work Order	19	
Technician	20PR-97			
Unit Under Test _				// / / / / / / / / / / / / / / / / / / /
Manufacturer		Model	SN	4A ASN 5352

STEP	FUNCTION OR RANGE	APPLIED	TOLERANCE	MEASURE	D VALUES	P/F
	Model		MIN - MAX	AS FOUND	RELEASED	
	. 1 920	1.900	1,899/ To 1,9009 1,592 F1.608 1:10 whyw	1899.64	Karolow	
	ž 940	1.980		1899.5		
	720	1,600	1.592 \$ 1.608			
	720 Recorderant		1:1 output	1899.8		
			,	1859.7		
						<u> </u>
						<u> </u>

Department of Quality Assurance Calibration Laboratory • 522-5215

CERTIFICATE # ASSI	ET # <u>003352</u>	date <u>25</u>	108/18
ITEM DATA:			
Manufacturer Oio	Model <u></u>	1900	
Description Then And Lea	Serial #	+ V64/A	
Accessories			
ACTION REQUESTED			
CUSTODIAN DIV 10, Sand Laur			
	one <u>holio</u>		
CHARGE #	_ Date Require	d	
Model Mode			
OTHER			
NEW WORK Yes No If yes, an evaluation	ation shall be made to	verify capabilities	5.
(K) Out of (S) Receive	tolerance, adjusted to sed into system, introduc	specifications ced or reactivated	
-1.7	_ Humidity	32%RH	
16 1 /1 5	0.1	c 0 0H-	$\sim \lambda l$
Date LTF6590	AccuracyMF	672	
77.5.18			
Next Cal due	Cal Time/	Repair Time	
Standards used (Asset#)			
	CKED UP BY	ul O	

CALIBRATION CHECK FORM

Date Calibrated	17FC59	Work Order	28771		i	
Technician	1LHurlis					
Unit Under Test	pH Meter				The wife	C2 C
36 6 4		Mac	Ial 520 A /720 A /020 A	SN	TV64HASN	3>3

STEP	FUNCTION OR RANGE	APPLIED	APPLIED TOLERANCE		MEASURED VALUES		
			MIN - MAX	AS FOUND	RELEASED		
1	Absolute Millivolts						
	Channel 1	-1500.0 mV	-1499.8 mV to -1500.2 mV	-1499.8		P	
, ,		-1000.0 mV	-999.8 mV to -1000.2 mV	-999.9		0	
		-500.0 mV	-499.8 mV to -500.2 mV	-508.0		P	
		000.0 mV	-000.2 mV to +000.2 mV	000.0		ρ	
		+500.0 mV	499.8 mV to 500.2 mV	499.9		P	
		+1000.0 mV	999.8 mV to 1000.2 mV	999.8	_		
		+1500.0 mV	1499.8 mV to 1500.2 mV	1499.8		<u> </u>	
	Channel 2	-1500.0 mV	-1499.8 mV to -1500.2 mV	-1499.9			
		-1000.0 mV	-999.8 mV to -1000.2 mV	- 999. 9			
· · · · ·		-500.0 mV	-499.8 mV to -500.2 mV	-500.1			
		000.0 mV	-000.2 mV to +000.2 mV	-000.2			
		+500.0 mV	499.8 mV to 500.2 mV	499. 8			
		+1000.0 mV	999.8 mV to 1000.2 mV	999 8		ļ	
		+1500.0 mV	1499.8 mV to 1500.2 mV	1499.8		<u> </u>	
	Polotina Millivolte						
<u> </u>	Channel 2 Relative Millivolts Channel 1 Channel 2	1500 mV	1400 2 V to 1500 7 V	1499.4		+	
			1499.3 mV to 1500.7 mV	1499.5		1-	
···	Channel 2	1500 mV	1499.3 mV to 1500.7 mV	1444.5		+	
						+	
						<u> </u>	

Department of Quality Assurance Calibration Laboratory • 522-5215

WORK ORDER

CERTIFICATE # ASSET # DATE DATE
ITEM DATA:
Manufacturer Ovion Model EA 970
Description _ ON MANUALLY Serial # Serial #
Accessories
ACTION REQUESTED
CUSTODIAN DIV. 20, (brv// f)uin
Turned in by: Phone Phone
CHARGE # 20 1407 5/1 0H 13/12 Date Required
INSTRUMENT USED ON: ☐ (DOD/NASA) ☑ (NUCLEAR) ☐ (GLP) ☐ (SPPE) ☐ (ISO) ☐ OTHER
COPY OF CALIBRATION CERTIFICATE ☐ (Yes) ☐ (No)
NEW WORK Yes Mo If yes, an evaluation shall be made to verify capabilities.
By Date Date
Work involves proprietary/confidential information or equipment ☐ (Yes) ☐ (No)
7
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) United Cal - nw volto OMF
CAL ENVIRONMENT:
Temperature73 °F Humidity46 %RH
CALIBRATED/REPAIRED:
By Cal Procedure CLCP PH-00)
Date 24 MATL99 Accuracy Mtg
Cal Interval Reliability Code: 2
Next Cal due 24 MMLOO Cal Time 1.5 Repair Time
Standards used (Asset#) 6413
nul mana as
DATE COMPLETED 14 MAY 99 DATE PICKED UP BY 10
DATE HOLD OF JULY FIGHER OF DET Three The

SwRI Form QA-174-0

CALIBRATION CHECK FORM

24 MAR95 _Work Order_ 33 57 5 Date Calibrated 24 MF Technician Murales Unit Under Test pH Meter

Manufactu	rer Orion	Model 290A/520A	/720A/920A SN V G	4A ASN 53	52	
STEP	FUNCTION OR RANGE	APPLIED	TOLERANCE	MEASURED Y	VALUES	P/F
			MIN - MAX	AS FOUND 1	RELEASED	1
1	Absolute Millivolts					
	Channel 1	-1500.0 mV	-1499.2 mV to -1500.8 mV	-149977		Pas
		-1000.0 mV	-999.5 mV to -1000.5 mV	-999.8mV		1
		-500.0 mV	-499.7 mV to -500.3 mV	-499.9m		
		000.0 mV	-000.2 mV to +000.2 mV	0.0m		
		+500.0 mV	499.7 mV to 500.3 mV	499.8m		
		+1000.0 mV	999.5 mV to 1000.5 mV	999.6m		
		+1500.0 mV	1499.2 mV to 1500.8 mV	1499.5m		
	Channel 2	-1500.0 mV	-1499.2 mV to -1500.8 mV	-1500 .Im		
		-1000.0 mV	-999.5 mV to -1000.5 mV	-1500 lm		
		-500.0 mV	-499.7 mV to -500.3 mV	-500.2m		\Box
		000.0 mV	-000.2 mV to +000.2 mV	2m		
		+500.0 mV	499.7 mV to 500.3 mV	499.7m		
		+1000.0 mV	999.5 mV to 1000.5 mV	999.5m		
		+1500.0 mV	1499.2 mV to 1500.8 mV	1499.4		I
2	Relative Millivolts					
	Channel 1	1500 mV	1499.1 mV to 1500.9 mV	1499.8m		1
	Channel 2	1500 mV	1499.1 mV to 1500.9 mV	1499.4m		V

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 DARRELL DUNN Custodian Tel. 6090 Div/CC DIV20 Location **B57** Charge/Project No. 20.00751.006 Proprietary/Confidental N Date Required ROUTINE Work Requested CALIBRATION Receiving Inspection O.K. Tel. 6090 **Delivered By MARGARET WORK HISTORY** Notes Date Start Time Stop Time **PARTS** Failure Description Part Number Part Name Cost **WORK SUMMARY** Failure Description Repair Action Cal Procedure CL-79, 6/99 Cal Hrs. // Repair Hrs. Part Cost Action Taken Standards Used /92 Date Cal 13 June 07 Int. 12 Mo. Date Due 13 June 01 Reliability Code 3 Picked Up By Meluna Date Picked Up 6/28/2000

workreg.rpt Rev 30 Jan 00

CALIBRATION CHECK FORM

Date Calibrated /3	June Co	_ Work Order	39372		Cal By	<u> </u>	Voralez	
Procedure No./Date:	CL-79,	<u>JUNE 99</u> [Unit Under Test:	PH	METER			
Mfo · ORION		Model · EA920)	SN	TU64A	AN	53S2	

STEP	FUNCTION OR RANGE	APPLIED	TOLE	ERANCE	MEASUREI	P/F	
			MIN	- MAX	AS FOUND	RELEASED	
2.2	MILLIVOLTS						
	INPUT 1	0.000mV	-0.5	+0.5mV	-0.2mU		ass
		1000.0mV	999	1001mV	999.5m		1
<u> </u>		-1000.0mV	-999	-1001mV	-0.2mU 999.5mJ -1000.1mJ		
	NAME AND THE						
	MILLIVOLTS INPUT 2	0.000mV	-0.5	+0.5mV	-0.2ml		-
		1000.0mV	999	1001mV	999.4mb		
		-1000.0mV	-999	-1001mV	-0.2 ml 999.4ml -999.2ml		V
	:			·			
							
							



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

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/NCSL 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 # 29372 m :\a2la.rp/ Rev date 22

Measurements performed by:

Vince Morales, Technician

Page 1 of 1

Calibration Laboratory

Processed	by RCRUZ	Z at 3:14:42PM o	n 7/20/01						
	005353			der 444044		lel <u>EA 9</u> 2	20	Arrived	<u>7/20/01</u>
Instrumer	nt Type/Cl	ass EXPANDAL	BLE IONANA	<u>ALYZER</u>	Serial N	o. <u>TV64</u>	<u>A</u>		
Accessory	No.	Calibrati	ion Procedur	e <u>CL-79, 6/99</u>				Location	<u>B57</u>
Div/Client	DIV20	Cı	ıstodian <u>D</u>	ARRELL DUNN		Mail Stop	<u>B57</u>	Tel. <u>6</u>	090
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Repair Ac	tion	4				- <u></u> :			
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Standard	s Used	182							
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Southwest Research Institute 6220 Culebra Road San Antonio, TX 78238 (210) 522-5215 **Department of Quality Assurance Calibration Laboratory**



0972-01

Certificate of Calibration

23 July 2001

Issued to:

DARRELL DUNN DIV20 B57

Manufacturer/Model:

ORION EA 920

Description:

EXPANDABLE IONANALYZER

Serial Number: Asset Number:

TV64A 005352

Work Order Number: 444044498

This certifies the above item was calibrated in compliance with MIL-STD-45662A and ANSI/NCSL 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:

Islin

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

Mark Romero, Technician

Measurements performed by:

m\a2la.rpt Rev date 8 Jan 01

Page 1 of 1

Southwest Research Institute Calibration Laboratory

			<i></i>	<u> </u>	
Work Order 444044498	Mfg. Orion	Tech	MJ 1	Julian	y Nonwro
Asset No. 005352	Model 720A and EA920	Procedu	e CL-	79, Jun	/ 99
Serial No. TV 64A	Type pH Meter	Cal Date	<i>43</i> 3	Tulu 2	ထု
			•	J	·
ł	Calibration As Found/As Released Data				

Parameter	Standard Reading	UUT As Found	Tolerance	UUT As Releas
2.2				
Millivolts				
Input 1	0.000 mV	OuV	-0.5 to +0.5 mV	
	1000.0 mV	999.5mV	999 to 1001 mV	
	-1000.0 mV	- 991.5 mV	-999 to -1001 mV	
Millivolts				
Input 2	0.000 mV	n /	-0.5 to +0.5 mV	
input 2	1000.0 mV	-0.1 m/ 001 v m/ -099 d m/	999 to 1001 mV	 /
	-1000.0 mV		-999 to -1001 mV	1/-
	-1000.01114	- 171.7 M/V	-999 to -10011111	/
	<u> </u>			
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Calibration Laboratory

	oy AANE	DERSON,7/3/02 10:42:3		7/3/02	Work Order 44	4404929	94
		Manufacturer <u>ORIO</u>	=		Model <u>EA 920</u>		
		EXPANDABLE IONAL		rial No. <u>T</u>	V64A	Accessory No.	
iterval	<u>12 M</u>	Calibration P	rocedure <u>CL-79, 6/99</u>	9		Location <u>B57</u>	
iv/Clien	1 <u>DIV20</u>	Custod	an <u>DARRELL DU</u>	<u>NN</u>	Mail Stop <u>B57</u>	Tel <u>6090</u>	
<u>N L</u>	NE	Special Instruction	LIMITED: MV US	SE ONLY.			
Notify be	efore adj	ustments or repairs. (_	Y Provide data with	certificate	Certificate Typ)	
Charge/	Project N	Vo. 00751.006 1.20	Request	er / Teleph	one		
This info	rmation	is correct for the work	requested.	Love	el ch		
			WORK N	NOTES			
ate	Hours	Remarks/Notes					
							
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Date	Hours	Part Name	Part Number	F	ailure Description	Co	st
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Standard	ds Used_	182					
·		1 .			(,))	
Date Pic	ked Up .	7/10/2002		Picked Up	By thull	<u> </u>	

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	Туре.	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)	
m Volts	m Volts	m Volts	m Volts	m Volts	m Volts	Results
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)	
m Volts	m Volts	m Volts	m Volts	m Volts	m Volts	Results
Input 2	0.0	-0.2	-0.2	0.5	0.0	Pass
	1000.0	999.5	-0.5	1.0	0.0	Pass
			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: Asset Number:

TV64A 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:

Institute Calibration Laboratory

Measurements performed by:

en Harp, Technician