Department of Quality Assurance Calibration Laboratory

CERTIFICATE OF CALIBRATION

Model: 720A

Issued to: DIV20 B168 NARASI SRIDHAR

Device No: 1441

Manufacturer: ORION

Nomenclature: PH/ISE METER

Serial Number: 003368 SwRI No:

Remarks

,

Accuracy: MFGR SPECS

Procedure: MFGR

ENVIRONMENT

Temperature: 70 Humidity: 48 Location: ROOM A11 B68 SWRI

CONCLUSION

Tolerance/Remarks: Received in tolerance, no adjustments made

Calibration was in accord with requirements of MIL-STD-45662A. Measurements are traceable to the National Institute of Standards and Technology. Inspection and test data are on file and available for inspection.

Signed Chillie Plum

Calibration Date: 02/15/93

Record Number: 00010657

Next Calibration Due: 08/15/93

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POST OFFICE DRAWER 20510 + 6220 CULEBRA ROAD + SAN ANTONIO, TEXAS, USA 78284 + (512) 684-5111+TELEX 78-7357

Division 05 - instru Cali	bration Rec	ibration Lai :0 rd	boratory	
BRIAN OHLISE	MERR			
$\frac{1}{720A} SN OC$	3368	SWRI NO.		
UG-INS, ETC.				
		·		
LERANCE _ limited calibra	tion the	ched i	in MV Fil	nation
- Unly reading	where we	thes -	.03 /2	
	STANDARDS			
Standard No. MPGR Model De	ecription S	N	Cal. Due	Cal. Rec. No.
JUN ROLE 850	Con Drem Verraise	n_	13 apr 91	05354
		·····	<u></u>	
				·
	•	•		<u> </u>
FNVTRONMENT: Temperatura		Humidity	<u>, 7 - 10 - 10 - 10 - 10 - 10 - 10 - 10 - </u>	
Location	All, Geld	6 68	SWRT	
	PROCEDURE			
Essentially as outlined in MPGRS Service	Manual	¥ 41.	014	
A applied MV from	Slondard #	E Cha	nnee / T	~
- reading but	Within -	.05 /4		
accuracy 19 prov		0111	<u></u>	
<u>,</u>	CONCLUSION			
Kem within tolerance	·	•		
Litem out of tolerance	· · · · · · · · · · · · · · · · · · ·			
				· · · · · · · · · · · · · · · · · · ·
Calibration was in accord with requirements of MIL-	STD-45662A. MIL-Q-98	SEA. and MIL	-I-45208A. Mees	irements are traceat
to the National Institute of Standards and Technology	. Inspection and test data		d available for ins	pection.
•·	SIGNED		<u> </u>	
0007468	DATE	26	2 Aug G	71
RECORD NUMBER:	NEXT CALIBRA	ATION DUE	10 aug 1	7

6220 CULEBRA ROAD • POST OFFICE DRAWER 28510 • SAN ANTONIO, TEXAS, USA 78228-0510 • (512) 684-5111 • TELEX 244846

Division 05 – Instrumen CERTIFICA	t Repair and Calibration Laboratory TE OF CALIBRATION
ISSUED TO, DIV 20 CNWRA	
MEGRIMODEL CIRION 720.A	
ITEM DESCRIPTION PN/ISE METER	
S/N 003368	SWRI NO
PLUG-INS, ETC. $N \gg 6$	
TOLERANCE <u>Lisited</u> Calibration. C <u>Reading</u> were within	Lecked in MV FUNCTION CNUY, , OS 5/0 STANDARDS
Standard No. MFGR Model Descrip	tion <u>S/N</u> <u>Cal. Due</u> <u>Cal. Rec. No.</u> Dicital VOITMEJER 4/83021 24/019292 08633
ENVIRONMENT: Temperature7 Location	40F Humidity 45% 211 BLDG 68 SWR
1	PROCEDURE
Essentially as outlined in MFGRS Service Man	
Applies MV FRon S	ANDRED TO CHANNE / IT Z.
Keading withe	$\frac{\omega_{+h,n} - 0.000}{1 + 50}$
- Cladurago STANDAL.	s = soppmy
C	CONCLUSION
- Item within tolerance	
Item ADI/repaired to tolerance	
Calibration was in accord with requirements of MIL-STD- Standards and Technology. Inspection and test data are on	45662A. Measurements are traceable to the National Institute of file and available for inspection.
	SIGNED a they O lim
	DATE 10FEB 9/2
RECORD NUMBER: 0008843	NEXT CALIBRATION DUE: 10 FEB93
ADS-05 Rev Sep/91	

August 30, 1993

MEMORANDUM

TO:	Narasi Sridhar
FROM:	Jim Patterson
SUBJECT:	Calibration Intervals

. . .

The calibration intervals for the following items have been changed as per request from division 20. The calibration interval for Orion pH/ISE Meter 720A S/N 003368 has been lengthened from six to twelve months. The calibration interval for Sartorius Electronic Balance RC210P S/N 10704379 has been shortened from six months to three months.

cc: B. Mabrito R. Brient T. Trbovich



Department of Quality Assurance Calibration Laboratory

Device Serial No: 003368

· . . .

Calibration Date: 02/15/93

STANDARDS

Manufacturer: JOHN FLUKE	Model: 8506A						
TRUE RMS DIGITAL MULTIMETER							
Cal.Due: 05/06/93	Cal.Rec.No: 00009154						
Manufacturer: JOHN FLUKE	Model: 5100B						
TOR							
Cal.Due: 04/08/93	Cal.Rec.No: 00009975						
	Manufacturer: JOHN FLUKE TRUE RMS DIGITAL MULTIMETER Cal.Due: 05/06/93 Manufacturer: JOHN FLUKE TOR Cal.Due: 04/08/93						

Department of Quality Assurance Calibration Laboratory

CERTIFICATE OF CALIBRATION

Issued to: DIV20 B57 NARASI SRIDHAR

Device No: 1441

6 Mo.

Manufacturer: ORION Model: 720A

Nomenclature: PH/ISE METER

Serial Number: 003368

Remarks

Accuracy: MFGR SPECS $-1600.0\overline{b}+1600.0$ $\pm 2.0000\pm0.050004\Delta E$

Procedure: MFGR

SwRI No: NONE Cal interval

ENVIRONMENT

Temperature: 70 Humidity: 46 Location: ROOM All B68 SWRI

CONCLUSION

Tolerance/Remarks: Received in tolerance, no adjustments made

LIMITED CALIBRATION- to millivolts only.

Calibration was in accord with requirements of MIL-STD-45662A. Measurements are traceable to the National Institute of Standards and Technology. Inspection and test data are on file and available for inspection.

Signed _ Childrey Place

Calibration Date: 08/09/93 Cal interval: 6 Months Next Calibration Due: 02/09/94

Record Number: 00011943

Department of Quality Assurance Calibration Laboratory

Device Serial No: 003368

-

Calibration Date: 08/09/93

STANDARDS ------Standard No: 132 Manufacturer: JOHN FLUKE Model: 5100B Nomenclature: CALIBRATOR Serial No: 2730017 Cal.Due: 10/23/93 Cal.Rec.No: 00010981

Department of Quality Assurance Calibration Laboratory

CERTIFICATE OF CALIBRATION

Issued to: DIV20 B57 NARASI SRIDHAR Device No: 1441

Manufacturer: ORION Model: 720A

Nomenclature: PH/ISE METER

Serial Number: 003368 SwRI No: NONE Cal interval

Remarks

Accuracy: MFGR SPECS $-1600.0\overline{1}+1600.0$ Procedure: MFGR $\pm 2 mvot 0.050 Jod E$

ENVIRONMENT

Temperature: 70 Humidity: 46 Location: ROOM A11 B68 SWRI

CONCLUSION

Tolerance/Remarks: Received in tolerance, no adjustments made

LIMITED CALIBRATION- to millivolts only.

Calibration was in accord with requirements of MIL-STD-45662A. Measurements are traceable to the National Institute of Standards and Technology. Inspection and test data are on file and available for inspection.

Signed _ athy Plan

Calibration Date: 08/09/93 Cal interval: 6 Months Next Calibration Due: 02/09/94

Record Number: 00011943

6 Mo.

Department of Quality Assurance Calibration Laboratory

CERTIFICATE OF CALIBRATION

Model: 720A

Issued to: DIV20 B168 NARASI SRIDHAR

Manufacturer: ORION

Nomenclature: PH/ISE METER

Serial Number: 003368 SwRI No:

Remarks

Accuracy: MFGR SPECS

Procedure: MFGR

Device No:

1441

Re G.

And States

¥-5-54-5

- Alexandre

ENVIRONMENT Temperature: 70 Humidity: 48 Location: ROOM All B68 SWRI

CONCLUSION

Tolerance/Remarks: Received in tolerance, no adjustments made

Calibration was in accord with requirements of MIL-STD-45662A. Measurements are traceable to the National Institute of Standards and Technology. Inspection and test data are on file and available for inspection.

Cuthe O la Signed 5.....

Calibration Date: 02/15/93

Record Number: 00010657

Next Calibration Due: 08/15/93

6220 CULEBRA ROAD . POST OFFICE DRAWER 28510 . SAN ANTONIO, TEXAS, USA 78228-0510 . (512) 684-5111 . TELEX 244846

Division 05 – Instrument Repair and Calibration Laboratory CERTIFICATE OF CALIBRATION

ISSUED TO: DIV 20 CNWRA ORION 720A MFGR/MODEL ORION ITEM DESCRIPTION PHIISE METER SWRI NO. ____ONE S/N 003368 PLUG-INS, ETC. N>~6 in MV FUNCTION CNLY, TOLERANCE Limited Calibration. Check Reading were within , 05010 **STANDARDS** Cal. Due Cal. Rec. No. Standard No. MFGR Model Description S/N _ _ ____ JOHNFLUKE 8506 A Digital VOITMETER 4180021 24 APR 92 08633 74°F Humidity 45% ENVIRONMENT: Temperature Room All BLDE 68 5N. Location PROCEDURE Essentially as outlined in MFGRS Service Manual FROM STANDARd To CHANNE / IT Z. MU ADD/15 . 8_ be when I-05010 STANDARD acurago ODM X CONCLUSION Item within tolerance Item out of tolerance . Item ADJ/repaired to tolerance _ Calibration was in accord with requirements of MIL-STD-45662A. Measurements are traceable to the National Institute of Standards and Technology. Inspection and test data are on file and available for inspection. D.C. SIGNED DATE 10FEB 9/2 10 FEB93 0008843 NEXT CALIBRATION DUE: __ RECORD NUMBER: intras. ADS-05 ** Rev Sen/91

POST OFFICE DRAWER 20510 + 6220 CULEBRA ROAD + SAN ANTONIO, TEXAS, USA 78284 + (\$12) 684-5111+TELEX 76-7357

Division 05 - Instrument Repair and Calibration Laboratory Calibration Record ITEM <u>ORION PHIJSE METTR</u> MODEL <u>720A</u> SN <u>003368</u> SWRINO. PLUG-INS. ETC. <u>METR</u> TOLERANCE _ collication checked in MV Remation ly reading were within \$.05% **STANDARDS** beeription SN 5506A Drinn Vourycom Cal. Due Standard No. MPGR Model 13 apr 91 03354 TAHN FLOKE Humidity ENVIRONMENT: Temperature SWRT 68 AIL. m Location PROCEDURE Essentially as outlined in MPGRS Service Manual My how standard & channel 1+2 appli \mathbf{N}_{-} within \$.05% n CONCLUSION m within tolerance Item out of tolerance Item ADJ/repeired to tolerance Calibration was in accord with requirements of MIL-STD-45662A, MIL-Q-4858A, and MIL-I-45208A. Measurements are traceable to the National Institute of Standards and Technology. Inspecting and test data are on file and available for inspection. SIGNED 20 Feb 41 DATE 0007468 NEXT CALIBRATION DUE: 20 Quy RECORD NUMBER:

Department of Quality Assurance Calibration Laboratory

CERTIFICATE OF CALIBRATION

Issued to: DIV20 B57 NARASI SRIDHAR

Device No: 1441

Manufacturer: ORION Model: 720A

Nomenclature: PH/ISE METER

Serial Number: 003368

Remarks

Accuracy: MFGR SPECS

Procedure: MFGR

Cal interval 12 Mo.

ENVIRONMENT

Temperature: 70 Humidity: 46 Location: ROOM All B68 SWRI

CONCLUSION

Tolerance/Remarks: Received in tolerance, no adjustments made

Calibration cycle extended to twelve months with new cal due date of August 8, 1994. Per memorandum from division 20 Narasi Sridhar, dated August 16, 1993.

LIMITED CALIBRATION- to millivolts only. Certificate revised aug 30, 1993.

Calibration was in accord with requirements of MIL-STD-45662A. Measurements are traceable to the National Institute of Standards and Technology. Inspection and test data are on file and available for inspection.

Signed	Atta

Calibration Date: 08/09/93

Cal interval: 12 Months Next Calibration Due: 08/09/94

Record Number: 00011943 R

SwRI No: NONE

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Department of Quality Assurance Calibration Laboratory

Device Serial No: 003368

a . 9

Calibration Date: 08/09/93

STANDARDS

Standard No:	132	Manufacturer: JOHN FLUKE	Model: 5100B					
Nomenclature:	CALIBRA	ATOR						
Serial No: 273	30017	Cal.Due: 10/23/93	Cal.Rec.No: 00010981					

Department of Quality Assurance Calibration Laboratory

CERTIFICATE OF CALIBRATION

Issued to: DIV20 B57 NARASI SRIDHAR

Device No: 1441

Manufacturer: ORION Model: 720A

Nomenclature: PH/ISE METER

Serial Number: 003368

Remarks *Accuracy: +/-0.2mV or +/-0.05% whichever is greater.

Accuracy: *

Procedure: MFGR

Cal interval 12 Mo.

ENVIRONMENT

SwRI No: NONE

Temperature: 70 Humidity: 35 Location: SWRI ROOM B4 BLDG. 64

CONCLUSION

Tolerance/Remarks: Received in tolerance, no adjustments made

Limited Calibration- millivolts only.

Calibration was in accord with requirements of MIL-STD-45662A. Measurements are traceable to the National Institute of Standards and Technology. Inspection and test data are on file and available for inspection.

21611 Signed <u>Auto</u>

Calibration Date: 08/09/94 Cal interval: 12 Months Next Calibration Due: 08/09/95

Record Number: 00014836

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Department of Quality Assurance Calibration Laboratory

Device Serial No: 003368

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Calibration Date: 08/09/94

STANDARDS

Standard No:	182 Manufact	urer: JOHN FLUKE	Model:	5700A			
Nomenclature: CA	LIBRATOR						
Serial No: 52000)03	Cal.Due: 09/17/	94 Cal.Rec.N	o: 00014563			

Department of Quality Assurance Calibration Laboratory

CERTIFICATE OF CALIBRATION 08/22/95

Issued to:	DARRELL DUNN	DIV20	, B57	Asset Numbe	r: 001441
Manufacturer:	ORION			Model Numbe	r: 720A
Nomenclature:	PH/ISE METER				
Serial Number:	003368			SwRI/Div. I	.D. #: NONE
Notes:					
		ENVIRON	MENTAL CONDITIONS		
Temperature: 7	4.OF			Relative Hu	midity: 35%

CALIBRATION INFORMATION

Procedure Number	: MFGR	Accuracy:	MFGR SPECS
Remarks:	LIMITED CALIBRATION MV ONLY	Received IN	Tolerance

Calibration was in accordance with requirements of MIL-STD-45662A. Measurements are traceable to the National Institute of Standards and Technology. Inspection and test data are on file and available for inspection.

STANDARDS USED FOR CERTIFICATION

 Asset #	Serial #	Mfg	Model #	Nomenclature	Cal Date	Int.	Cal Due
 000132	2730017	FLUKE	5100B	CALIBRATOR	05/18/95	6	11/18/95

Certified by :

Cultury Olmen

Calibration Date: 08/22/95 Interval: 12 months Next Calibration Due: 08/22/96

Certificate#: 18272



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

Certificate of Calibration

16 August 1996

Issued to:	DARRELL DUNN	DIV20	B57
Manufacture	r/Model: ORION	720A	
Description	PH/ISE METER		
Serial Numb	er: 003368		
Asset Numb	er: 001441		

Environmental Conditions

Temperature: 74.0 **Humidity:** 45%

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:	16 Aug 96	Calibration	Procedure: MFGR	
Interval:	12 mont	hs	Accuracy:	MFGR SPECS	
Next Calibr	ation Du	Je: 16 Aug 97	Received:	In Tolerance	
Remarks:	LIMITED	CALIBRATION TO MILLIV	OLTS	\bigcap	

LAST PAGE OF REPORT Total Pages Printed:

1

Certificate # 22387

Signed:



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

Certificate of Calibration

25 September 1997

Issued to:DARRELL DUNNDIV20B57Manufacturer/Model:ORION720ADescription:PH/ISE METERSerial Number:003368Asset Number:001441

Environmental Conditions

Temperature:72.0Deg. FHumidity:39%

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.

The uncertainty of the calibration was sufficient to determine that the instrument met the manufacturer's specifications.

Calibration Date: 25 Sep 97	Calibration Procedure: CLCP-PH-001
Interval: 12 months	Uncertainty: MFG SPECS
Next Calibration Due: 25 Sep 98	Received: In Tolerance

Remarks: LIMITED CALIBRATION PER 97-CD-35

Standards Used

Asset	MFR
000182	FLUKE

Model 5700A Description CALIBRATOR Serial No. 5200003 Due Cal 2 Oct 97

Soff Rehnician Signed: Title:

LAST PAGE OF REPORT Total Pages Printed: 1

Certificate # 26575



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



Certificate of Calibration

28 October 1998

DIV20

B57

Issued to: DARRELL DUNN Manufacturer/Model: ORION 720A Description: PH/ISE METER Serial Number: 003368 Asset Number: 001441

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.

This laboratory is accredited by the American Association for Laboratory Accreditation (A2LA) and the results shown in this calibration certificate have been determined in accordance with the laboratory's terms of accreditation unless stated otherwise in the report. The uncertainty of the calibration was sufficient to determine that the instrument met the manufacturer's specifications.

Temperature: 72.0 Deg. F	Humidity: 42 % RH
Calibration Date: 28 Oct 98	Calibration Procedure: CLCP-PH-001
Interval: 12 months	Received: IN TOLERANCE
Next Calibration Due: 28 Oct 99	

Remarks: LIMITED CALIBRATION- CALIBRATED FOR MV USE ONLY.

Standards Used

Asset	MFR	Model	Description	Serial No.	Due Cal
004164	FLUKE	5500A	MULTI-PRODUCT CALIBRATOR	6380025	14 Apr 99

Signed: Title:

LAST PAGE OF REPORT Total Pages Printed: 1

S. R		SOUTHV	VEST RES 6220 Culebra Ro Institute Institute Cal Phone: 210-522-:	EARCH INSTITU oad, P.O. Drawer 28510 Quality Systems ibration Laboratory 5215 Fax 210-522-3692	TETM
	R		Certificate	e of Calibration	0972-01
6	Submitted Rue	DIV20		Wark Arder	• 444056988
	Address:	B57		Date Issued	• $Ian 22 2004$
	Contact:	DARRELL DUNN		Calibration Date	: Jan 22, 2004
Manufa	contact:	ORION 720A		**Calibration Due	: Jan 22, 2005
171un una	Description:	PH/ION METER		Calibration Location	: Bldg. 64
	Serial No:	003368		Environment	: Temp. 72.0°F Hum. 36 %RH
	Asset No:	001441		*As Found	: LIMITED CALIBRATION
	Procedure:	CL-79. Jun/99		*As Left	: LIMITED CALIBRATION
This certificate conforms to IS ⁰ be reproduced, instrument deso U. S. Governm Uncertainty eva	documents traceab O/IEC 17025, 1999 except in full, with cribed above. This ent aluation includes th	oility to the National Institute of and ANSI/NCSL Z540-1 out the written approval of certificate shall not be use the item under test and is cardinal statement.	tute of Standards and Tech I-1994 which are equivaler of the Southwest Research ed to claim product endors alculated in accordance wi	nology (NIST) and the International System of 1 nt to relevant requirements of the ISO 9000-199 Institute Calibration Laboratory. The results of ement by the American Association for Laborat the the ISO "Guide to the Expression of Uncertai	Units (SI). The Laboratory quality system 4 series of standards. This certificate may not this calibration relate only to the individual tory Accreditation (A2LA) or any agency of the inty in Measurement" (GUM). The uncertainty
*The client has on the Test Insi stability of the **Calibration i be out of tolera Remarks:	sole responsibility rument (TI) readin TI. nterval is determin nce before the next Millivolts cali	for determination of in/o g(s) and limits as reported ed by the client and does r t calibration date. (brated only.	ut of tolerance or compliar d. The reported uncertainty not assure the instrument w	nce/noncompliance. An in/out of tolerance opin y relates only to the results at the time of calibra will remain within tolerance until this date. Any	ion is provided for your convenience based only tion and does not imply any short or long term number of factors may cause the instrument to
Standards U	Used				
Asset	Manufacturer	N	lodel	Description	Cal Due
000182	FLUKE	5	700A/EP	CALIBRATOR	Mar 04, 04
Approved by	y: Walt Hill	Lik		Measuremen	ts by: Mark Romero

Metrology Group Leader m:\a2la1.rpt Rev date 15, August 02

•.

1 of 1

Southwest Research Institute Calibration Laboratory Calibration Report

Work Order:	444056988	Mfr.	Orion		Technician	Mark Romero
Asset No.	001441	Model	720A			
Serial No.	003368	Туре.	pH Meter		Cal Date.	22-Jan-04
Remarks:						
			CAL: Millivolts Only	У		
E	Test Deint	TIDeedine	Difference	L/Limpit	. / Uncortaint.	Found/Loft
Function/Range	l est Point	TI Reading	Difference	+/-LIMIt	+/-Uncertainty	Found/Leit
mVolts	mVolts	mVolts	mVolts	mVolts	mVolts	Result
Input 1	0.0	-0.1	-0.1	0.5	0.12	Pass
	1000.0	999.8	-0.2	1.0	0.12	Pass
	-1000.0	-1000.2	-0.2	1.0	0.12	Pass
mVolts	mVolts	mVolts	mVolts	mVolts	mVolts	
Input 2	0.0	-0.1	-0.1	0.5	0.12	Pass
·	1000.0	1000.0	0.0	1.0	0.12	Pass
	-1000.0	-1000.2	-0.2	1.0	0.12	Pass
		END	OF REPORT			

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		SOUTHW	VEST RESE 6220 Culebra Road, Institute Qua Institute Calibra Phone: 210-522-521	ARCH INSTITU P.O. Drawer 28510 ality Systems ation Laboratory 5 Fax 210-522-3692	ГЕ™	ACCREDITED Certificate #
	®		Certificate of	f Calibration		0972-01
	Submitted By:	DIV20 B57	1,-10,-11,-11,-11,-11,-11,-11,-11,-11,-1	Work Order: Data Issued	444059853 Jul 13, 2004	
	Contact:	DARRELL DUNN		Calibration Date:	Jul 13, 2004	
Manuf	acturer Model:	ORION /20A		" " Calibration Due: Calibration Location:	Bldg 64	
	Serial No:	005885		Environment:	Temp. 73.0°F	Hum. 40 %RH
	Asset No:	001869		*As Found:	LIMITED CAL	IBRATION
	Procedure:	CL-79, Jun/99		*As Left:	LIMITED CAL	IBRATION
be reproduced instrument de U. S. Governi Uncertainty e represents an number for ca	d, except in full, with escribed above. This ment evaluation includes the expanded uncertaint alibration data.	nout the written approval of certificate shall not be use the item under test and is ca ty using a coverage factor	of the Southwest Research Insti ed to claim product endorsemer alculated in accordance with the of k=2 to approximate a 95% c	tute Calibration Laboratory. The results of t nt by the American Association for Laborato e ISO "Guide to the Expression of Uncertain onfidence level. See Remarks or attached Co	ns callbration relate of ry Accreditation (A2) ty in Measurement" (alibration Report with	only to the individual LA) or any agency of the GUM). The uncertainty h the same Work Order
**Calibration be out of toler	interval is determin rance before the next	ed by the client and does r t calibration date.	not assure the instrument will re	emain within tolerance until this date. Any r	umber of factors may	v cause the instrument to
iveniai KS;	None					
Standards	Used			Description		Cal Due
Standards Asset 006413	Used Manufacturer FLUKE	M 5:	lodel 520A/SC1100	Description MULTI-PRODUCT CALIBRA	ATOR	Cal Due Feb 19, 05
Standards Asset 006413	Used Manufacturer FLUKE	M 5:	lodel 520A/SC1100	Description MULTI-PRODUCT CALIBRA	ATOR	Cal Due Feb 19, 05

Southwest Research Institute Calibration Laboratory Calibration Report

Work Order:	444059853	Mfr.	Orion		Technician	SRK
Asset No.	001869	Model	720A			
Serial No.	005885	Туре.	pH Meter		Cal Date.	13-Jul-04
Remarks:						
		LIMITED C	CAL: Millivolts Only			
Function/Range	Test Point	TI Reading	Difference	+/-Limit	+/-Uncertainty	Found/Left
mVolts	mVolts	mVolts	mVolts	mVolts	mVolts	Result
Input 1	0.0	-0.5	-0.5	0.5	0.12	Pass
	1000.0	999.3	-0.7	1.0	0.12	Pass
	-1000.0	-1000.3	-0.3	1.0	0.12	Pass
mVolts	mVolts	mVolts	mVolts	mVolts	mVolts	
Input 2	0.0	-0.2	-0.2	0.5	0.12	Pass
·	1000.0	999.4	-0.6	1.0	0.12	Pass
	-1000.0	-1000.0	0.0	1.0	0.12	Pass
		END	OF REPORT			

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Sw R I	SOUTHWEST RE 6220 Culebra Institut Institute O Phone: 210-52 Certific	SEARCH INSTITUT Road, P.O. Drawer 28510 te Quality Systems Calibration Laboratory 2-5215 Fax 210-522-3692 ate of Calibration	ГЕтм
Submitted By: Address: Contact: Manufacturer Model: Description: Serial No: Asset No: Procedure: This certificate documents traceal	DIV20 B57 DARRELL DUNN ORION 720A PH/ION METER 003368 001441 CL-79, Jun/99 bility to the National Institute of Standards and T	Work Order: Date Issued: Calibration Date: **Calibration Due: Calibration Location: Environment: *As Found: *As Found: *As Left: echnology (NIST) and the International System of Un	444062505 Jan 21, 2005 Jan 21, 2005 Jan 21, 2006 Bldg. 64 Temp. 73.0°F Hum. 42 %R LIMITED CALIBRATION LIMITED CALIBRATION hits (SI). The Laboratory quality systemetrics of standards. This certificate mathematical standards.
instrument described above. This U. S. Government. Uncertainty evaluation includes the represents an expanded uncertaint number for calibration data. *The client has sole responsibility on the Test Instrument (TI) reading stability of the TI.	certificate shall not be used to claim product end the item under test and is calculated in accordance by using a coverage factor of $k=2$ to approximate for determination of in/out of tolerance or comp ug(s) and limits as reported. The reported uncertainty	dorsement by the American Association for Laborator e with the ISO "Guide to the Expression of Uncertaint a 95% confidence level. See Remarks or attached Ca diance/noncompliance. An in/out of tolerance opinion unity relates only to the results at the time of calibration	y Accreditation (A2LA) or any agency y in Measurement" (GUM). The unce libration Report with the same Work (n is provided for your convenience bas on and does not imply any short or long
** Calibration interval is determin	ed by the client and does not assure the instrume	nt will remain within tolerance until this date. Any n	umber of factors may cause the instrum
the calibration interval is determine be out of tolerance before the nex Remarks: Cal'd for Mill Standards Used Asset Manufacturer	t calibration date. volts only	nt will remain within tolerance until this date. Any n Description	umber of factors may cause the instrun
Calibration interval is determine be out of tolerance before the nex Remarks: Cal'd for Mill Standards Used Asset Manufacturer 006413 FLUKE	Model	nt will remain within tolerance until this date. Any n Description MULTI-PRODUCT CALIBRA	umber of factors may cause the instrun Cal Due TOR Feb 19,
Standards Used Asset Manufacturer 006413	Model 5520A/SC1100	nt will remain within tolerance until this date. Any n Description MULTI-PRODUCT CALIBRA	umber of factors may cause the instrum Cal Due TOR Feb 19,
e out of tolerance before the nex Remarks: Cal'd for Mill Standards Used Asset Manufacturer 006413 FLUKE	Model 5520A/SC1100	nt will remain within tolerance until this date. Any n Description MULTI-PRODUCT CALIBRA	umber of factors may cause the instrum Cal Due TOR Feb 19,

Southwest Research Institute Calibration Laboratory Measurement Report

Work Order:	444062505	Mfr.	Orion	<u></u>	Technician	WCL
Asset No.	001441	Model	720A			
Serial No.	003368	Туре.	pH Meter		Cal Date.	21-Jan-05
Remarks:						
			CAL: Millivolts On	ly		
Function/Range	Test Point	TI Reading	Difference	+/-Limit	+/-Uncertainty	Found/Left
Relative	m Volts	m Volts	m Volts	m Volts	m Volts	Result
Input 1	0.0	-0.1	-0.1	0.2	0.13	Pass
	1000.0	999.9	-0.1	0.5	0.13	Pass
	-1000.0	-1000.1	-0.1	0.5	0.13	Pass
m Volts	m Volts	m Volts	m Volts	m Volts	m Volts	
Input 2	0.0	-0.1	-0.1	0.2	0.13	Pass
	1000.0	999.9	-0.1	0.5	0.13	Pass
	-1000.0	-1000.2	-0.2	0.5	0.13	Pass
Absolute	m Volts	m Volts	m Volts	m Volts	m Voits	
Input 1	0.0	-0.1	-0.1	0.2	0.13	Pass
	1000.0	1000.1	0.1	0.5	0.13	Pass
	-1000.0	-1000.2	-0.2	0.5	0.13	Pass
m Volts	m Volts	m Volts	m Volts	m Volts	m Volts	
Input 2	0.0	-0.1	-0.1	0.2	0.13	Pass
	1000.0	1000.1	0.1	0.5	0.13	Pass
	-1000.0	-1000.2	-0.2	0.5	0.13	Pass
		END	OF REPORT			

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R R I	SOUTHWEST R 6220 Culeb Insti Institute Phone: 210-: Certifi	ESEARCH INSTITUT ra Road, P.O. Drawer 28510 tute Quality Systems e Calibration Laboratory 522-5215 Fax 210-522-3692 icate of Calibration	ГЕтм
Submitted By:	DIV20	Work Order:	444051757
Address:	B57	Date Issued:	Jan 21, 2003
Contact:	DARRELL DUNN	Calibration Date:	Jan 21, 2003
Manufacturer Model:	ORION 720A	**Calibration Due:	Jan 21, 2004
Description:	PH/ION METER	Calibration Location:	N/A
Serial No:	003368	Environment:	Temp. 72.0°F Hum. 37 %RH
Asset No:	001441	*As Found:	IN TOLERANCE
Procedure:	CL-79, 6/99	*As Left:	IN TOLERANCE
J. S. Government. Jncertainty evaluation includes the represents an expanded uncertaint han or equal to 25% (4:1) of the the "The client has sole responsibility on the Test Instrument (TI) reading trability of the TI. **Calibration interval is determine be out of tolerance before the next Remarks: MILLIVOLT	the item under test and is calculated in accordance to training outer of $k=2$ to approximate the init unless otherwise stated in remarks or of or determination of in/out of tolerance or cong(s) and limits as reported. The reported uncerted by the client and does not assure the instrurt to calibration date. CALIBRATION ONLY	nce with the ISO "Guide to the Expression of Uncertaint te a 95% confidence level. The calibration process prov an attachment mpliance/noncompliance. An in/out of tolerance opinior rtainty relates only to the results at the time of calibratic nent will remain within tolerance until this date. Any m	y in Measurement" (GUM). The uncertainty rides a Test Uncertainty Ratio (TUR) of less in is provided for your convenience based only in and does not imply any short or long term imber of factors may cause the instrument to
Standards Used			
Asset Manufacturer	Model	Description	Cal Due
Asset Manufacturer 000182 FLUKE	Model 5700A/EP	Description CALIBRATOR	Cal Due Feb 19, 03
Asset Manufacturer 000182 FLUKE	Model 5700A/EP	Description CALIBRATOR	Cal Due Feb 19, 03

Southwest Research Institute Calibration laboratory Calibration Sheet.

Work Order:	444051757	Mfr.	Orion	Technician	Thomas Hannon	
Asset No.	001441		720A and EA920	Procedure	CL-79 7/99	
Serial No.	003368	Туре.	pH Meter	Cal Date.	21-Jan-03	
Remarks:						ļ
		[<u>IMITED CAL: Milliv</u>	olts Only		
Function/Range	Test Point	TI Reading	Difference	Test Limits+/-	Uncertainty	Found/Left
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	1000.0	0.0	1.0	0.0	Pass
	-1000.0	-1000.0	0.0	1.0	0.0	Pass
Function/Range	Test Point	TI Reading	Difference	Test Limits+/-	Uncertainty	
m Volts	m Volts	m Volts	m Volts	m Volts	m Volts	Results
Input 2	0.0	-0.1	-0.1	0.5	0.0	Pass
·	1000.0	999.9	-0.1	1.0	0.0	Pass
	-1000.0	-1000.3	-0.3	1.0	0.0	Pass
			END OF REPORT			

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	and the second		6220 Culebra	Road, P.O. Drawer 28510		
R			Institute C	Calibration Laboratory		
			Phone: 210-52	2-5215 Fax 210-522-3692	Certificate #	
	®		Certifica	ate of Calibration	0972-01	
S	Submitted By:	DIV20		Work Order:	444054459	
	Address:	B57		Date Issued:	Jul 15, 2003	
	Contact:	DARRELL DUNN		Calibration Date:	Jul 15, 2003	
Manufa	cturer Model:	ORION 720A		**Calibration Due:	Jul 15, 2004	
	Description:	PH/ION METER		Calibration Location:	Bldg. 64	
	Serial No:	005885		Environment:	I MITED CALIDRATION	
	Asset No:	001869 CL 70 6/00		*As Loft:	LIMITED CALIBRATION	
This costificate	documento traccol	CL-79, 0799	ute of Standards and Te	AS LET.	nits (SD) The Laboratory quality system	
uncertainty evaluations of the second	O/IEC 17025, 1999 except in full, with cribed above. This ent.	and ANSI/NCSL Z540-1 nout the written approval of certificate shall not be us ne item under test and is cardinal statement.	-1994 which are equiva of the Southwest Resear ed to claim product end alculated in accordance	alent to relevant requirements of the ISO 9000-1994 rch Institute Calibration Laboratory. The results of t horsement by the American Association for Laborato	series of standards. This certificate may not his calibration relate only to the individual ry Accreditation (A2LA) or any agency of the ty in Measurement" (GUM). The uncertainty	
represents an e than or equal to	xpanded uncertain 25% (4:1) of the	ty using a coverage factor test limit unless otherwise	of k=2 to approximate a stated in remarks or an	a 95% confidence level. The calibration process pro attachment.	vides a Test Uncertainty Ratio (TUR) of less	
that of equal to	20,0 (11) 01 110					
*The client has on the Test Inst	sole responsibility trument (TI) readir	for determination of in/o (s) and limits as reported	ut of tolerance or compl I. The reported uncerta	liance/noncompliance. An in/out of tolerance opinic inty relates only to the results at the time of calibrati	on is provided for your convenience based only on and does not imply any short or long term	
stability of the	TI.		L L			
**Calibration	nterval is determin	ed by the client and does	not assure the instrume	nt will remain within tolerance until this date. Any r	number of factors may cause the instrument to	
be out of tolera	nce before the nex	t calibration date.	for assure the instrument			
Remarks:	Limited Calib	oration: Millivolt Use	Only			
Standards I	Used					
Standards Asset	Used Manufacturer	N	lodel	Description	Cal Due	
Standards Asset 000182	U sed Manufacturer FLUKE	M 5	lodel 700A/EP	Description CALIBRATOR	Cal Due Aug 19, 03	
Standards Asset 000182	Used Manufacturer FLUKE		lodel 700A/EP	Description CALIBRATOR	Cal Due Aug 19, 03	
Standards Asset 000182	Used Manufacturer FLUKE	N 5	lodel 700A/EP	Description CALIBRATOR	Cal Due Aug 19, 03	
Standards V Asset 000182	Used Manufacturer FLUKE		lodel 700A/EP	Description CALIBRATOR	Cal Due Aug 19, 03	
Standards V Asset 000182	Used Manufacturer FLUKE		lodel 700A/EP	Description CALIBRATOR	Cal Due Aug 19, 03	
Standards Asset 000182	Used Manufacturer FLUKE	N 5	fodel 700A/EP	Description CALIBRATOR	Cal Due Aug 19, 03	
Standards V Asset 000182	Used Manufacturer FLUKE		lodel 700A/EP	Description CALIBRATOR	Cal Due Aug 19, 03	
Standards V Asset 000182	Used Manufacturer FLUKE	N 5	lodel 700A/EP	Description CALIBRATOR	Cal Due Aug 19, 03	
Standards Asset 000182	Used Manufacturer FLUKE		lodel 700A/EP	Description CALIBRATOR	Cal Due Aug 19, 03	
Standards Asset 000182	Used Manufacturer FLUKE		lodel 700A/EP	Description CALIBRATOR	Cal Due Aug 19, 03	
Standards Asset 000182	Used Manufacturer FLUKE	N 5	lodel 700A/EP	Description CALIBRATOR	Cal Due Aug 19, 03	
Standards V Asset 000182	Used Manufacturer FLUKE	N 5	lodel 700A/EP	Description CALIBRATOR	Cal Due Aug 19, 03	
Standards V Asset 000182	Used Manufacturer FLUKE	M 5	lodel 700A/EP	Description CALIBRATOR	Cal Due Aug 19, 03	
Standards Asset 000182	Used Manufacturer FLUKE		lodel 700A/EP	Description CALIBRATOR	Cal Due Aug 19, 03	
Standards Asset 000182	Used Manufacturer FLUKE	N 5	lodel 700A/EP	Description CALIBRATOR	Cal Due Aug 19, 03	
Standards Asset 000182	Used Manufacturer FLUKE	N 5	lodel 700A/EP	Description CALIBRATOR	Cal Due Aug 19, 03	
Standards Asset 000182	Used Manufacturer FLUKE	W 5	lodel 700A/EP	Description CALIBRATOR	Cal Due Aug 19, 03	
Standards Asset 000182	Used Manufacturer FLUKE	W 5	lodel 700A/EP	Description CALIBRATOR	Cal Due Aug 19, 03	
Standards Asset 000182	Used Manufacturer FLUKE	N 5	lodel 700A/EP	Description CALIBRATOR	Cal Due Aug 19, 03	
Standards Asset 000182	Used Manufacturer FLUKE	N 5	lodel 700A/EP	Description CALIBRATOR	Cal Due Aug 19, 03	
Standards Asset 000182	Used Manufacturer FLUKE		lodel 700A/EP	Description CALIBRATOR	Cal Due Aug 19, 03	
Standards Asset 000182	Used Manufacturer FLUKE		lodel 700A/EP	Description CALIBRATOR	Cal Due Aug 19, 03	
Standards Asset 000182	Used Manufacturer FLUKE		lodel 700A/EP	Description CALIBRATOR	Cal Due Aug 19, 03	
Standards V Asset 000182	Used Manufacturer FLUKE y: Walt Hill Frouge Looder	5 Jui	lodel 700A/EP	Description CALIBRATOR	Cal Due Aug 19, 03	
Standards V Asset 000182	Used Manufacturer FLUKE	n 5 I	lodel 700A/EP	Description CALIBRATOR	Cal Due Aug 19, 03	

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Work Order:	444054459	Mfr.	Orion		Technician	TJH				
Asset No.	001869	Model	720A							
Serial No.	005885	Туре.	pH Meter		Cal Date.	15-Jul-03				
Remarks:										
LIMITED CAL: Millivolts Only										
Function/Range	Test Point	TI Reading	Difference	+/-Limit	+/-Uncertainty	Found/Left				
mVolts	mVolts	mVolts	mVolts	mVolts	mVolts	Result				
Input 1	0.0	0.3	0.3	0.5	0.12	Pass				
·	1000.0	999.1	-0.9	1.0	0.12	Pass				
	-1000.0	-1000.4	-0.4	1.0	0.12	Pass				
END OF REPORT										
mVolts	mVolts	mVolts	mVolts	mVolts	mVolts					
Input 2	0.0	-0.2	-0.2	0.5	0.12	Pass				
·	1000.0	999.5	-0.5	1.0	0.12	Pass				
	-1000.0	-999.9	0.1	1.0	0.12	Pass				
END OF REPORT										

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