

Certificate of Calibration

27 August 1996

Issued to:DARRELL DUNNDIV20B57Manufacturer/Model:ERTCO 15-166ADescription:THERMOMETERSerial Number:C96-377Asset Number:004993

Environmental Conditions

Temperature: 78.0

Humidity: 38%

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: 26 Aug 96	Calibration Procedure:	WI-9-30-TH03
Interval: 6 months	Accuracy: MFGR	
Next Calibration Due: 26 Feb 97	Received: In Tolerance	

Remarks:

Certificate # 22440

Signed:	Kaffar	/

LAST PAGE OF REPORT
Total Pages Printed: 1



Certificate of Calibration

21 February 1997

Issued to:DARRELL DUNNDIV20B57Manufacturer/Model:ERTCO 15-166ADescription:THERMOMETERSerial Number:C96-377Asset Number:004993

Environmental Conditions

Temperature: 80.0 Deg. F Humidity: 40%

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: WI-9-30-TH03
Interval: 6 months	Accuracy: +/-1 DEG.C
Next Calibration Due: 20 Aug 97	Received: In Tolerance
Remarks:	

Standards Used

Asset	MFR	Model	Description	Serial No.	Due Cal
000328	AZONI	A12001	RTD TEMPERATURE PROB	351477	12 Mar 97
000219	AZONI	A1011	RTD THERMOMETER	T1587-2078	12 Mar 97

Certificate # 24335

Signed:

LAST PAGE OF REPORT Total Pages Printed: 1



Certificate of Calibration

4 September 1997

Issued to:DARRELL DUNNDIV20B57Manufacturer/Model:FISHERBRAND/ERTCO15-166ADescription:THERMOMETERSerial Number:C96-377Asset Number:004993

Environmental Conditions

Temperature: 80.0 Deg. F Humidity: 34%

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: 3 Sep 97	Calibration Procedure: WI-9-30-TH03
Interval: 6 months	Accuracy: +/-1 DEG.C
Next Calibration Due: 3 Mar 98	Received: In Tolerance

Remarks:

Standards Used

Asset	MFR	Model	Description	Serial No.	Due Cal
000219	AZONIX	A1011	RTD THERMOMETER	T1587-2078	24 Mar 98
000328	AZONIX	A12001	RTD TEMPERATURE PROB	351477	3 Apr 98

Certificate # 26588

Signed:

LAST PAGE OF REPORT Total Pages Printed: 1



Certificate of Calibration

10 March 1998

Issued to: DARRELL DUNN DIV20 B57 Manufacturer/Model: FISHERBRAND/ERTCO 15-166A Description: THERMOMETER Serial Number: C96-377 Asset Number: 004993

Environmental Conditions

Temperature: 66.00 Deg. F

Humidity: 26 % RH

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.

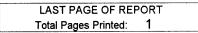
Calibration Date:	10 Mar 98	Calibration Procedure:	WI 9-30-TH03
Interval: 6	months		
Next Calibration D	ue: 10 Sep 98	Received: In Tolerance	

Remarks:

Standards Used

Asset	MFR	Model	Description	Serial No.	Due Cal	
000219	AZONIX	A1011	RTD THERMOMETER	T1587-2078	24 Mar 98	
000328	AZONIX	A12001	RTD TEMPERATURE PROBE	351477	3 Apr 98	

Signed: Title:



Certificate # 28926





Certificate of Calibration

30 October 1998

issued to: DARRELL DUNN DIV20 Manufacturer/Model: FISHERBRAND/ERTCO 15-166A **Description:** THERMOMETER Serial Number: C96-377 Asset Number: 004993

B57

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.

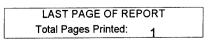
Temperature: 72.0 Deg. F Humidity: 64 % RH 30 Oct 98 33K5-4-42-1 30 APR 97 **Calibration Date: Calibration Procedure:** Interval: months **Received: IN TOLERANCE** 6 Next Calibration Due: 30 Apr 99

Remarks:

Standards Used

Asset	MFR	Model	Description	Serial No.	Due Cal
000219 000328	AZONIX AZONIX	A1011 A12001	RTD THERMOMETER RTD TEMPERATURE PROBE	T1587-2078 351477	16 Apr 99 27 Apr 99

	11,18/1	
Signed:	Watt All	<i>v</i>
Title:	Cal Tah	



Certificate # 31709





Certificate # 0972-01

Certificate of Calibration

12 May 1999

Issued to:DARRELL DUNN DIV20 B57Manufacturer/Model:FISHER SCIENTIFIC 15-166ADescription:THERMOMETERSerial Number:C96-377Asset Number:004993

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.

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: 71.0 Degrees Fahrenheit Humidity: 50 % RH

Calibration Date: 12 May 99

Calibration Procedure: T.O.33K5-4-42-1, APR97

Condition as Received: IN TOLERANCE

Condition as Released: IN TOLERANCE

Remarks:

Approved by:

Jim Patterson, Supervisor or Walt Hill, Metrologist Certificate # 34400 m:\a2la.rpt Rev date 10 Mar 99 Measurements performed by:

Ken Harp, Technician

Page 1 of 1



Certificate of Calibration

11 July 2002

Issued to:DARRELL DUNN DIV20 B57Manufacturer/Model:FISHER SCIENTIFIC 15-166ADescription:THERMOMETERSerial Number:C96-377Asset Number:004993Work Order Number:444049286

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: 81.0 Degrees Fahrenheit Humidity: 42 % RH

Calibration Date: 9 Jul 02 Calibration Procedure: CL-9 MAY 99

Condition as Received: IN TOLERANCE

Condition as Returned: IN TOLERANCE

Remarks:

Approved by:

Walt Hill, Metrology Group Leader Institute Calibration Laboratory

m:\nona2la.rpt Rev date 8 Jan 01

performed by: Vince Morales, Technician

Page 1 of 1

Southwest Research Institute Calibration laboratory Calibration Sheet.

Work Order:	444049286	Mfr.	Fisher Scientific	Technician	V.Morales	
Asset No.	4993	Model	15-166A	Procedure	CL-9 5/99	
Serial No.	C96-377	Туре.	THERMOMETER	Cal Date	7/9/02	
Function/Range	Standard	TI Reading	Difference (1)	Test Limits+/-	Results	
Temperature	Deg. C	Deg. C	Deg. C	Deg. C		
-20	-19.83	-20.00	-0.17	1.00	Pass	
0	0.10	0.30	0.20	1.00	Pass	
50	50.01	50.00	-0.01	1.00	Pass	
100	99.95	100.00	0.05	1.00	Pass	
150	149.92	149.90	-0.02	1.00	Pass	
0	-0.04	0.30	0.34	1.00	Pass	

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R	SOUT ®	6220 Culebra Road Institute Qu Institute Calibu Phone: 210-522-52	CARCH INSTITU A, P.O. Drawer 28510 hality Systems ration Laboratory 15 Fax 210-522-3692 of Calibration	ГЕтм
Man ufa This certificate conforms to IS be reproduced instrument des U. S. Governm Uncertainty ev represents an e than or equal t *The client has on the Test Irss stability of the	O/IEC 17025, 1999 and ANSI/NCSL except in full, without the written app cribed above. This certificate shall no nent. aluation includes the item under test ar expanded uncertainty using a coverage to 25% (4:1) of the test limit unless other sole responsibility for determination trument (TI) reading(s) and limits as re TI.	NTIFIC 15-166A TER I Institute of Standards and Technolo Z540-1-1994 which are equivalent to roval of the Southwest Research Inst t be used to claim product endorsem that is calculated in accordance with the factor of k=2 to approximate a 95% provise stated in remarks or an attach of in/out of tolerance or compliance/ ported. The reported uncertainty re	Calibration Date: **Calibration Due: Calibration Location: Environment: *As Found: *As Found: *As Left: ogy (NIST) and the International System of U or elevant requirements of the ISO 9000-1994 titute Calibration Laboratory. The results of the ent by the American Association for Laborator the ISO "Guide to the Expression of Uncertain confidence level. The calibration process pro ment noncompliance. An in/out of tolerance opinic lates only to the results at the time of calibration	Jan 13, 2003 Jan 13, 2003 Jul 13, 2003 N/A Temp. 76.0°F Hum. 30 %RH IN TOLERANCE IN TOLERANCE inits (SI). The Laboratory quality system 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 vides a Test Uncertainty Ratio (TUR) of less on is provided for your convenience based only on and does not imply any short or long term
	nce before the next calibration date. None	does not assure the instrument will	remain within tolerance until this date. Any n	number of factors may cause the instrument to
Asset	Manufacturer	Model	Description	Cal Due
008920 009137	HART SCIENTIFIC, INC HART SCIENTIFIC, INC	17660-A-120-6-W 1575	PLATINUM RTD THERMOMETER	Jul 06, 03 Jul 06, 03
Approved b Metrology (y: Walt Hill Group Leader pt Rev date 15, August 02	4ú	Measurements Metrology Tea	theco s by: Vince Morales chnician

Work Order:	444051766	Mfr.	FISHER SCIENTIFIC	Technician	V Morales	
Asset No.	4993	Model	15-166A	Rev Level	0, 02-JUL-02	
Serial No.	C96-377	Туре.	THERMOMETER	Cal Date.	13-Jan-03	
Remarks:				ou Duo		

Temperature	Deg C	Deg C	Deg C	Deg C	Deg C	Results
-20	-19.85	-19.80	0.05	0.50	1.2	Pass
0	0.00	0.00	0.00	0.50	1.2	Pass
50	49.98	49.90	-0.08	0.50	1.2	Pass
100	99.92	99.90	-0.02	0.50	1.2	Pass
150	150.06	150.00	-0.06	0.50	1.2	Pass

R	R	50011	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 f Calibration	
Manuf This certifica conforms to I be reproduced instrument de U. S. Governi Uncertainty e represents an	acturer Model: Description: Serial No: Asset No: Procedure: te documents traceab SO/IEC 17025, 1995 d, except in full, with scribed above. This ment valuation includes th expanded uncertaint	B57 DARRELL DU FISHER SCIEJ THERMOMET C96-377 004993 TEMPERATU bility to the National and ANSI/NCSL 2 bout the written appr certificate shall not	NTIFIC 15-166A FER RE, MAY/03 Institute of Standards and Technolog 540-1-1994 which are equivalent to oval of the Southwest Research Insti be used to claim product endorsement d is calculated in accordance with the	*As Found: *As Left: gy (NIST) and the International System of U relevant requirements of the ISO 9000-1994 tute Calibration Laboratory. The results of t nt by the American Association for Laborato e ISO "Guide to the Expression of Uncertain onfidence level. The calibration process pro	Jul 16, 2003 Jul 15, 2003 Jan 15, 2004 Bldg. 64 Temp. 77.0°F Hum. 47 %RH IN TOLERANCE IN TOLERANCE nits (SI). The Laboratory quality system series of standards. This certificate may not
	strument (TI) readin				n is provided for your convenience based onl on and does not imply any short or long term
	rance before the next None	•	does not assure the instrument will re	emain within tolerance until this date. Any r	number of factors may cause the instrument to
be out of toles Remarks:	rance before the next None	r calibration date.	does not assure the instrument will re Model 1575 17660-A-120-6-W	emain within tolerance until this date. Any r Description THERMOMETER PLATINUM RTD	number of factors may cause the instrument to Cal Due Jul 30, 03 Jul 30, 03

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Southwest Research Institute Calibration laboratory Caibration Report

Work Order: Asset No.	444054469 004993	Mfr. Model	Fisher Scientific 15-166A		Technician	Mark Romero
Serial No.	C96-377	Туре.	THERMOMETER		Cal Date.	15-Jul-03
Remarks:						
Function/Range	Test Point	TI Reading	Difference	+/-Limit	+/-Uncertainty	Found/Left
Temperature	Deg C	Deg C	Deg C	Deg C	Deg C	Results
	-19.9	-20.1	-0.2	0.5	0.6	Pass
	0.1	-0.2	-0.3	0.5	0.6	Pass
	50.0	49.5	-0.5	0.5	0.6	Pass
	99.5	100.0	0.5	0.5	0.6	Pass
	150.1	150.0	-0.1 END OF REPORT	0.5	0.6	Pass

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	SO SO	6220 Culebra Ro Institute Institute Cal Phone: 210-522-:	SEARCH INSTITU oad, P.O. Drawer 28510 Quality Systems libration Laboratory 5215 Fax 210-522-3692	ΓΕ TM
	R	Certificate	e of Calibration	0972-01
	Submitted By: DIV20 Address: B57		Work Order: Date Issued:	444056973 Jan 16, 2004
Manufa		R SCIENTIFIC 15-166A	Calibration Date: **Calibration Due:	Jul 15, 2004
	Description: THERM Serial No: C96-37 Asset No: 004993	7		Temp. 79.0°F Hum. 45 %RH IN TOLERANCE
	Procedure: TEMPI	ERATURE, MAY/03	*As Left:	IN TOLERANCE
nstrument des U.S. Governr Uncertainty eve epresents an o	scribed above. This certificate nent. valuation includes the item unc expanded uncertainty using a c	shall not be used to claim product endors ler test and is calculated in accordance wit	Institute Calibration Laboratory. The results of t ement by the American Association for Laborato th the ISO "Guide to the Expression of Uncertain 5% confidence level. The calibration process pro achment.	ry Accreditation (A2LA) or any agency of th ty in Measurement" (GUM). The uncertainty
*The client ha on the Test In stability of the	strument (TI) reading(s) and li	nination of in/out of tolerance or complian mits as reported. The reported uncertainty	nce/noncompliance. An in/out of tolerance opinion y relates only to the results at the time of calibrati	n is provided for your convenience based only on and does not imply any short or long term
	interval is determined by the c ance before the next calibratio None			
be out of toler Remarks: Standards Asset	ance before the next calibratio None	n date. Model	Description	Cal Due
e out of toler Remarks: Standards	ance before the next calibratio None Used	n date. Model C 1575		
e out of toler Remarks: Standards Asset 009137	ance before the next calibratio None Used Manufacturer HART SCIENTIFIC, IN	n date. Model C 1575	Description THERMOMETER	Cal Due Feb 05, 04
e out of toler Remarks: Standards Asset 009137	ance before the next calibratio None Used Manufacturer HART SCIENTIFIC, IN	n date. Model C 1575	Description THERMOMETER	Cal Due Feb 05, 04

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Southwest Research Institute Calibration laboratory Calibration Report

Work Order: Asset No.	444056973 004993	Mfr. Model	Fisher-Scientific 15-166A		Technician	Mark Romerc
Serial No.	C96-377	Туре.	THERMOMETER		Cal Date.	15-Jan-04
Remarks:						
Function/Range	Test Point	TI Reading	Difference	+/-Limit	+/-Uncertainty	Found/Left
Temperature	Deg C	Deg C	Deg C	Deg C	Deg C	Result
-	-19.9	-20.2	-0.3	0.5	0.6	Pass
	-19.9	-20.2	-0.5	0.5	0.0	1 435

-0.1

-0.1

-0.3

END OF REPORT

0.5

0.5

0.5

0.6

0.6

0.6

Pass

Pass

Pass

49.9

99.9

149.6

50.0

100.0

149.9

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R	SOU	6220 Culebra Road Institute Qu Institute Calibr Phone: 210-522-52	CARCH INSTITUT d, P.O. Drawer 28510 hality Systems ration Laboratory 15 Fax 210-522-3692 of Calibration	ACCREDITED Certificate #
				0972-01
	Submitted By: DIV20 Address: B57		Work Order: Date Issued:	
Manuf	Contact: DARREL acturer Model: FISHER S		Calibration Date: **Calibration Due:	
	Description: THERMO	IMETER	Calibration Location:	Bldg. 64
	Serial No: C96-377		Environment:	Temp. 77.0°F Hum. 48 %RH
	Asset No: 004993		*As Found:	IN TOLERANCE
	Procedure: TEMPER	ATURE, JAN/04	*As Left:	IN TOLERANCE
be reproduced instrument de U. S. Governi Uncertainty e represents an	d, except in full, without the writte escribed above. This certificate sh ment valuation includes the item under	in approval of the Southwest Research Inst all not be used to claim product endorseme test and is calculated in accordance with th	o relevant requirements of the ISO 9000-1994 titute Calibration Laboratory. The results of the ent by the American Association for Laborator he ISO "Guide to the Expression of Uncertaint confidence level. See Remarks or attached Ca	is calibration relate only to the individual y Accreditation (A2LA) or any agency of the y in Measurement" (GUM). The uncertainty
	strument (TI) reading(s) and limit		noncompliance. An in/out of tolerance opinio lates only to the results at the time of calibratic	
Remarks: Standards				
Asset	Manufacturer	Model	Description	Cal Due
008920 009137	HART SCIENTIFIC HART SCIENTIFIC	5614-17660-A-12 1575	PLATINUM RTD THERMOMETER	Sep 09, 04 Sep 05, 04

Southwest Research Institute Calibration Laboratory Calibration Report

Work Order: Asset No.	444059849 004993	Mfr. Model	Fisher Scientific 15-166A		Technician	Mark Romerc
Serial No Remarks:	C96-377	Туре.	THERMOMETER		Cal Date.	14-Jul-04
Eunction/Range	Test Point		Difference	+/-l imit	+/-Uncertainty	Found/Left

Function/Range	Test Point	II Reading	Difference	+/-Limit	+/-Uncertainty	Found/Left
 Temperature	Deg C	Deg C	Deg C	Deg C	Deg C	Result
-20	-19.8	-20.2	-0.4	0.5	0.58	Pass
0	0.1	0.0	-0.1	0.5	0.58	Pass
50	50.0	50.0	0.0	0.5	0.58	Pass
100	100.0	100.0	0.0	0.5	0.58	Pass
150	150.0	150.0 END Of	0.0 F REPORT	0.5	0.58	Pass

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R		6220 Culebra Roa Institute Q Institute Calit Phone: 210-522-52	EARCH INSTITU ad, P.O. Drawer 28510 uality Systems bration Laboratory 215 Fax 210-522-3692	ACCREDITED Certificate #
	R	Certificate	of Calibration	0972-01
	Submitted By: DIV20 Address: B57 Contact: DARREL	L DUNN	Work Order: Date Issued: Calibration Date:	Jan 10, 2005
Manufa	acturer Model: FISHER S Description: THERMC		**Calibration Due: Calibration Location:	Bldg. 64
	Serial No: C96-377 Asset No: 004993 Procedure: TEMPER.	ATURE, JAN/04	*As Found:	Temp. 73.0°F Hum. 40 %RH IN TOLERANCE IN TOLERANCE
epresents and umber for ca The client ha	valuation includes the item under t expanded uncertainty using a cove dibration data. as sole responsibility for determina sfrument (TI) reading(s) and limit.	erage factor of k=2 to approximate a 95%	the ISO "Guide to the Expression of Uncertain % confidence level. See Remarks or attached Ca e/noncompliance. An in/out of tolerance opinic relates only to the results at the time of calibrati	alibration Report with the same Work Orde
	•		Il remain within tolerance until this date. Any r	umber of factors may cause the instrument
be out of toler Remarks: Standards	ance before the next calibration d None Used	ate.		
e out of toler Remarks: Standards Asset 009414	ance before the next calibration d None Used Manufacturer HART SCIENTIFIC	Model 1502A	Description TEMPERATURE READOUT	Cal Due Mar 30, 05
e out of toler Remarks: tandards Asset	ance before the next calibration d None Used Manufacturer	Model	Description	Cal Due

Southwest Research Institute Calibration Laboratory Measurement Report

Terrenerature		°C	°C	°C	°C	Decult
Function/Range	Test Point	TI Reading	Difference	+/-Limit	+/-Uncertainty	Found/Lef
Remarks:	Accuracy Refe	erecnce ANSI Z2	236.1-1983			
Serial No.	C96-377	Туре.	THERMOMETER	२	Cal Date.	10-Jan-05
Asset No.	004993	Model	15-166A (ASTM	1C)		
Work Order:	444062197	Mfr.	Fisher-Scientific		Technician	blt

Temperature	°C	°C	°C	°C	°C	Result
	-18.9	-19.0	-0.1	0.5	0.12	Pass
	0.1	0.1	0.0	0.5	0.12	Pass
	50.0	50.0	0.0	0.5	0.12	Pass
	99.9	99.9	0.0	0.5	0.12	Pass
	150.1	150.1	0.0	0.5	0.12	Pass
		END O	F REPORT			

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