S O U T H W E S T R E S E A R C H I N S T I T U T E

Department of Quality Assurance
Calibration Laboratory

CERTIFICATE OF CALIBRATION

Issued to: DIV20 B168 NARASI SRIDHAR Device No: 2045

Manufacturer: FISHER Model: 14-983-10B

Nomenclature: THERMOMETER

Serial Number: 0323007 SwRI No: NONE

Remarks

Accuracy: MFGR Procedure: MFGR

ENVIRONMENT

Temperature: 80 Humidity: 56 Location: BLDG.145 SWRI

CONCLUSION

Tolerance/Remarks: Received into the system, introduced or reactivated

Temperature checked in bath using standard as reference.

Reference:	Thermometer:
0	0
20	20
40	39.5
80	80
100	101

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 _____

Calibration Date: 02/02/93

Record Number: 00010604 Next Calibration Due: 02/02/94

S O U T H W E S T R E S E A R C H I N S T I T U T E

Department of Quality Assurance
Calibration Laboratory

Device Serial No: 0323007 Calibration Date: 02/02/93

STANDARDS

Standard No: 159 Manufacturer: FISHER Model: 15-041B
Nomenclature: THERMOMETER
Serial No: 891-2261 Cal.Due: 02/02/94 Cal.Rec.No: 00010626

S O U T H W E S T R E S E A R C H I N S T I T U T E

Department of Quality Assurance
Calibration Laboratory

CERTIFICATE OF CALIBRATION

Issued to: DIV20 B57 NARASI SRIDHAR Device No: 2045

Manufacturer: FISHER Model: 14-983-10B

Nomenclature: THERMOMETER

Serial Number: 0323007 SwRI No: NONE Cal interval 12 Mo.

Remarks

Accuracy: MFGR Procedure: MFGR

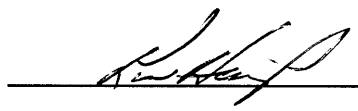
ENVIRONMENT

Temperature: 76 Humidity: 40 Location: SWRI DIV04 BLDG. 145

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 

Calibration Date: 03/21/94

Cal interval: 12 Months

Record Number: 00013657 Next Calibration Due: 03/21/95

S O U T H W E S T R E S E A R C H I N S T I T U T E

Department of Quality Assurance
Calibration Laboratory

Device Serial No: 0323007 Calibration Date: 03/21/94

STANDARDS

Standard No: 219 Manufacturer: AZONIX Model: A1011
Nomenclature: RTD THERMOMETER
Serial No: T1587-2078 Cal.Due: 03/10/95 Cal.Rec.No: 00013377

Standard No: 328 Manufacturer: AZONIX Model: A12001
Nomenclature: RTD TEMPERATURE PROBE
Serial No: 351477 Cal.Due: 03/10/95 Cal.Rec.No: 00013378

SOUTHWEST RESEARCH INSTITUTE

Department of Quality Assurance
Calibration Laboratory

CERTIFICATE OF CALIBRATION
03/29/95

Issued to: DARRELL DUNN DIV20 ,B57
Manufacturer: FISHE
Nomenclature: THERMOMETER
Serial Number: 0323007

Asset Number: 002045
Model Number: 14-983-10B
SwRI/Div. I.D. #: NONE

ENVIRONMENTAL CONDITIONS

Temperature: 70.0F

Relative Humidity: 45%

CALIBRATION INFORMATION

Procedure Number: WI-9-30-TH03
Remarks:

Accuracy: MFGR SPECS
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
000219	T1587-2078	AZONI	A1011	RTD THERMOMETER	03/06/95	12	03/06/96
000328	351477	AZONI	A12001	RTD TEMPERATURE PROBE	03/06/95	12	03/06/96

Certified by : _____

Calibration Date: 03/29/95
Interval: 12 months
Next Calibration Due: 03/29/96

Certificate#: 16827

SOUTHWEST RESEARCH INSTITUTE

Department of Quality Assurance
Calibration Laboratory

CERTIFICATE OF CALIBRATION
04/01/96

Issued to: DARRELL DUNN DIV20 ,B57
Manufacturer/Model: FISHE/14-983-10B
Nomenclature: THERMOMETER
Serial Number: 0323007
Asset Number: 002045
Notes:

ENVIRONMENTAL CONDITIONS

Temperature: 74.0F

Relative Humidity: 28%

CALIBRATION INFORMATION

Procedure Number: WI-9-30-TH03
Remarks:

Accuracy: MFGR SPECS
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
000159	891-2261	FISHE	15-041B	THERMOMETER	02/19/96	12	02/19/97

Certified by : _____

Calibration Date: 04/01/96
Interval: 12 months
Next Calibration Due: 04/01/97

Certificate#: 20804

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

Certificate of Calibration

15 April 1997

Issued to: DARRELL DUNN DIV20 B57
Manufacturer/Model: FISHERBRAND 14-983-10B
Description: THERMOMETER
Serial Number: 0323007
Asset Number: 002045

Environmental Conditions

Temperature: 70.0 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: 15 Apr 97 **Calibration Procedure:** WI-9-30-TH03

Interval: 12 months **Accuracy:** MFGR SPECS

Next Calibration Due: 15 Apr 98 **Received:** In Tolerance

Remarks:

Standards Used

Asset	MFR	Model	Description	Serial No.	Due Cal
000106	FLUKE	8506A	THERMAL RMS DIGITAL M	4180021	31 Jan 98
005174	AZONIX	A12001	PRECISION RTD TEMPERA	438295	11 Nov 97

Certificate # 25037 **Signed:**

LAST PAGE OF REPORT
Total Pages Printed: 1

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

ACCREDITED

Certificate of Calibration

11 May 1998

Issued to: DARRELL DUNN DIV20 B57
Manufacturer/Model: FISHERBRAND 14-983-10B
Description: THERMOMETER
Serial Number: 0323007
Asset Number: 002045

Environmental Conditions

Temperature: 80.00 Deg. F **Humidity:** 32 % 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: 11 May 98 **Calibration Procedure:** ASTM E77-89

Interval: 12 months

Next Calibration Due: 11 May 99 **Received:** In Tolerance

Remarks:

Standards Used

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

Signed: _____

Title: _____

LAST PAGE OF REPORT
Total Pages Printed: 1

Certificate # 29650

SOUTHWEST RESEARCH INSTITUTE™

6220 Culebra Road, P.O. Drawer 28510
Institute Quality Systems
Institute Calibration Laboratory
Phone: 210-522-5215 Fax 210-522-3692

Certificate of Calibration

Submitted By:	DIV20	**Work Order:**	444050126
Address:	B57	**Date Issued:**	Sep 17, 2002
Contact:	DARRELL DUNN	**Calibration Date:**	Sep 17, 2002
Manufacturer Model:	FISHER SCIENTIFIC 14-983-10B	****Calibration Due:**	Sep 17, 2003
Description:	THERMOMETER	**Calibration Location:**	N/A
Serial No:	0323007	**Environment:**	Temp. 74.0°F Hum. 50 %RH
Asset No:	002045	***As Found:**	IN TOLERANCE
Procedure:	CL-9, 5/99	***As Left:**	IN TOLERANCE

This certificate documents traceability to the National Institute of Standards and Technology (NIST) and the International System of Units (SI). The Laboratory quality system conforms to ISO/IEC 17025, 1999 and ANSI/NCSL Z540-1-1994 which are equivalent to relevant requirements of the ISO 9000-1994 series of standards. This certificate may not be reproduced, except in full, without the written approval of the Southwest Research Institute Calibration Laboratory. The results of this calibration relate only to the individual instrument described above. This certificate shall not be used to claim product endorsement by the American Association for Laboratory Accreditation (A2LA) or any agency of the U. S. Government.

Uncertainty evaluation includes the item under test and is calculated in accordance with the ISO "Guide to the Expression of Uncertainty in Measurement" (GUM). The uncertainty represents an expanded uncertainty using a coverage factor of k=2 to approximate a 95% confidence level. The calibration process provides a Test Uncertainty Ratio (TUR) of less than or equal to 25% (4:1) of the test limit unless otherwise stated in remarks or an attachment.

*The client has sole responsibility for determination of in/out of tolerance or compliance/noncompliance. An in/out of tolerance opinion is provided for your convenience based only on the Test Instrument (TI) reading(s) and limits as reported. The reported uncertainty relates only to the results at the time of calibration and does not imply any short or long term stability of the TI.

**Calibration interval is determined by the client and does not assure the instrument will remain within tolerance until this date. Any number of factors may cause the instrument to be out of tolerance before the next calibration date.

Remarks: None

Standards Used

Asset	Manufacturer	Model	Description	Cal Due
009137	HART SCIENTIFIC, INC	1575	THERMOMETER	Dec 10, 02
008920	HART SCIENTIFIC, INC	17660-A-120-6-W	PLATINUM RTD	Dec 07, 02

Approved by: Walt Hill
Metrology Group Leader

Measurements by: Walt Hill
Metrology Technician

Southwest Research Institute
Calibration laboratory
Calibration Sheet.

Work Order:	444050126	Mfr.	FISHER SCIENTIFIC	Technician	WHILL
Asset No.	002045	Model	14-983-10B	Procedure	CL-9 5/99
Serial No.	323007	Type.	THERMOMETER	Cal Date.	September 17, 2002
Remarks:					

Function/Range	Standard	TI Reading	Difference	Test Limits+/-	Uncertainty	Found/Left
	Deg c	Deg c	Deg c	Deg c	Deg c	Results
-20	-19.83	-19.3	0.5	1	1.2	Pass
0	0.10	0.0	-0.1	1	1.2	Pass
40	40.02	40.0	0.0	1	1.2	Pass
70	69.98	70.1	0.1	1	1.2	Pass
100	99.94	100.1	0.2	1	1.2	Pass

SOUTHWEST RESEARCH INSTITUTE™

6220 Culebra Road, P.O. Drawer 28510
Institute Quality Systems
Institute Calibration Laboratory
Phone: 210-522-5215 Fax 210-522-3692

ACCREDITED
Certificate #
0972-01

Certificate of Calibration

Submitted By:	DIV20	**Work Order:**	444055694
Address:	B57	**Date Issued:**	Oct 13, 2003
Contact:	DARRELL DUNN	**Calibration Date:**	Oct 9, 2003
Manufacturer Model:	FISHER SCIENTIFIC 14-983-10B	****Calibration Due:**	Oct 9, 2004
Description:	THERMOMETER	**Calibration Location:**	Bldg. 64
Serial No:	0323007	**Environment:**	Temp. 75.0°F Hum. 45 %RH
Asset No:	002045	***As Found:**	IN TOLERANCE
Procedure:	TEMPERATURE, MAY/03	***As Left:**	IN TOLERANCE

This certificate documents traceability to the National Institute of Standards and Technology (NIST) and the International System of Units (SI). The Laboratory quality system conforms to ISO/IEC 17025, 1999 and ANSI/NCSL Z540-1-1994 which are equivalent to relevant requirements of the ISO 9000-1994 series of standards. This certificate may not be reproduced, except in full, without the written approval of the Southwest Research Institute Calibration Laboratory. The results of this calibration relate only to the individual instrument described above. This certificate shall not be used to claim product endorsement by the American Association for Laboratory Accreditation (A2LA) or any agency of the U. S. Government.

Uncertainty evaluation includes the item under test and is calculated in accordance with the ISO "Guide to the Expression of Uncertainty in Measurement" (GUM). The uncertainty represents an expanded uncertainty using a coverage factor of k=2 to approximate a 95% confidence level. The calibration process provides a Test Uncertainty Ratio (TUR) of less than or equal to 25% (4:1) of the test limit unless otherwise stated in remarks or an attachment.

*The client has sole responsibility for determination of in/out of tolerance or compliance/noncompliance. An in/out of tolerance opinion is provided for your convenience based only on the Test Instrument (TI) reading(s) and limits as reported. The reported uncertainty relates only to the results at the time of calibration and does not imply any short or long term stability of the TI.

**Calibration interval is determined by the client and does not assure the instrument will remain within tolerance until this date. Any number of factors may cause the instrument to be out of tolerance before the next calibration date.

Remarks:

Standards Used

Asset	Manufacturer	Model	Description	Cal Due
009414	HART SCIENTIFIC, INC	1502A	TEMPERATURE READOUT	Feb 07, 04
009917	HART SCIENTIFIC, INC	5612	RTD	Feb 07, 04

Approved by: Walt Hill
Metrology Group Leader
m:\a2la1.rpt Rev date 15, August 02

Measurements by: Vince Morales
Metrology Technician

Southwest Research Institute
Calibration laboratory
Caibration Report

Work Order:	444055694	Mfr.	Fisher-Scientific	Technician	Vmorales
Asset No.	002045	Model	14-983-10b		
Serial No.	0323007	Type.	THERMOMETER	Cal Date.	09-Oct-03
Remarks:	Accuracy Referecnce ANSI Z236.1-1983				

Function/Range	Test Point	TI Reading	Difference	+/-Limit	+/-Uncertainty	Found/Left
Temperature	Deg C	Deg C	Deg C	Deg C	Deg C	Result
-20	-18.9	-19.2	-0.3	0.5	0.1	Pass
0	0.1	0.0	-0.1	0.5	0.1	Pass
50	50.0	49.9	-0.1	0.5	0.1	Pass
100	99.9	100.2	0.3	0.5	0.1	Pass

END OF REPORT

SOUTHWEST RESEARCH INSTITUTE™

6220 Culebra Road, P.O. Drawer 28510
Institute Quality Systems
Institute Calibration Laboratory
Phone: 210-522-5215 Fax 210-522-3692

ACCREDITED
Certificate #
0972-01

Certificate of Calibration

Submitted By:	DIV20	**Work Order:**	444061098
Address:	B57	**Date Issued:**	Oct 18, 2004
Contact:	DARRELL DUNN	**Calibration Date:**	Oct 14, 2004
Manufacturer Model:	FISHER SCIENTIFIC 14-983-10B	****Calibration Due:**	Oct 14, 2005
Description:	THERMOMETER	**Calibration Location:**	Bldg. 64
Serial No:	0323007	**Environment:**	Temp. 73.0°F Hum. 40 %RH
Asset No:	002045	***As Found:**	IN TOLERANCE
Procedure:	TEMPERATURE, JAN/04	***As Left:**	IN TOLERANCE

This certificate documents traceability to the National Institute of Standards and Technology (NIST) and the International System of Units (SI). The Laboratory quality system conforms to ISO/IEC 17025, 1999 and ANSI/NCSL Z540-1-1994 which are equivalent to relevant requirements of the ISO 9000-1994 series of standards. This certificate may not be reproduced, except in full, without the written approval of the Southwest Research Institute Calibration Laboratory. The results of this calibration relate only to the individual instrument described above. This certificate shall not be used to claim product endorsement by the American Association for Laboratory Accreditation (A2LA) or any agency of the U. S. Government.

Uncertainty evaluation includes the item under test and is calculated in accordance with the ISO "Guide to the Expression of Uncertainty in Measurement" (GUM). The uncertainty represents an expanded uncertainty using a coverage factor of k=2 to approximate a 95% confidence level. See Remarks or attached Calibration Report with the same Work Order number for calibration data.

*The client has sole responsibility for determination of in/out of tolerance or compliance/noncompliance. An in/out of tolerance opinion is provided for your convenience based only on the Test Instrument (TI) reading(s) and limits as reported. The reported uncertainty relates only to the results at the time of calibration and does not imply any short or long term stability of the TI.

**Calibration interval is determined by the client and does not assure the instrument will remain within tolerance until this date. Any number of factors may cause the instrument to be out of tolerance before the next calibration date.

Remarks: None

Standards Used

Asset	Manufacturer	Model	Description	Cal Due
005325	XITRON TECHNOLOGIES	2000M	V/A/T CALIBRATOR	Nov 13, 04
009137	HART SCIENTIFIC	1575	THERMOMETER	Mar 20, 05
008920	HART SCIENTIFIC	5614-17660-A-12	PLATINUM RTD	Mar 30, 05

Approved by: Walt Hill
Metrology Group Leader

Measurements by: Bob Trollinger
Metrology Technician

Southwest Research Institute
Calibration Laboratory
Measurement Report

Work Order:	444061098	Mfr.	Fisher-Scientific	Technician	blt
Asset No.	002045	Model	14-983-10B		
Serial No.	0323007	Type.	THERMOMETER	Cal Date.	14-Oct-04
Remarks:	No accuracy is provided by manufacturer. +/- 1 Degree C resolution is used as the accuracy specification.				

Function/Range	Test Point	TI Reading	Difference	+/-Limit	+/-Uncertainty	Found/Left
Temperature	°C	°C	°C	°C	°C	Result
	-19.8	-19.0	0.8	1.0	1.2	Pass
	0.1	0.2	0.1	1.0	1.2	Pass
	50.0	49.8	-0.2	1.0	1.2	Pass
	100.0	99.5	-0.5	1.0	1.2	Pass

END OF REPORT