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

WORK ORDER

CERTIFICATE # 25039 ASSET # 005134 DATE 01 Apr 97

ITEM DATA:

Manufacturer Fisher Scientific / Isotemp Model 15 [illegible]

Description [illegible] Serial # CK-183

Accessories

ACTION REQUESTED [illegible] Water Bath System

CUSTODIAN DIV. 70, Dave Dunn

Turned in by: [illegible] Phone [illegible]

CHARGE # 70-5708-501 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) Calibrated for Accuracy.

[illegible]	[illegible]
-0.01°C	0.0°C
-9.97°C	10.0°C
45.02°C	45.0°C
89.98°C	90.0°C
129.98°C	129.5°C

CAL ENVIRONMENT:
Temperature 77 °F Humidity 27 %RH

CALIBRATED/REPAIRED:
By [illegible]
Date 15 Apr 97
Cal Interval 6 Mos
Next Cal due 15 Oct 97
Cal Procedure 61-9-30-Tbl3
Accuracy +/- 1°C
Time to complete:
Cal 2.5 Repair
Standards used (Asset#) 106, 5174

DATE COMPLETED 17 Apr 97
DATE PICKED UP 4/17/97 PICKED UP BY [illegible]

SwRI Form QA-169-2

1889

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

WORK ORDER

CERTIFICATE # 27264 ASSET # 005434 DATE 20 OCT. 97

ITEM DATA:

Manufacturer Fisher Scientific Model 15-166A

Description Thermometer Serial # 96-783

Accessories

ACTION REQUESTED cal

CUSTODIAN DD, PD, Dwell Dam

Turned in by: Phone 6892

CHARGE # 20 1402.561 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

27264

ACTION TAKEN: (Calibration/Repair/Parts) calibrated per procedure

CAL ENVIRONMENT:
Temperature 78 °F Humidity 41 %RH

CALIBRATED/REPAIRED:
By Cal Procedure ASTM E77-92
Date 29 OCT 97 Accuracy +/- 1°C
Cal Interval 6 mos Reliability Code: 2
Next Cal due 29 Apr 98 Cal Time 1.5 Repair Time
Standards used (Asset#) 215, 328

DATE COMPLETED 30 OCT 97
DATE PICKED UP 11/3/97 PICKED UP BY

SwRI Form QA-174-0

CALIBRATION CHECK FORM

Date Calibrated 29 Oct 97 Work Order 27264
Technician 8216 CAL. PROCEDURE: ASTM E77-92
Unit Under Test THERMOMETER
Manufacturer FISHER BRAND Model 15-166A SN C96-783 ASN 5434

STEP	FUNCTION OR RANGE	APPLIED	TOLERANCE		MEASURED VALUES		P/F
			MIN - MAX		AS FOUND	RELEASED	
		°C	°C		°C		
		0.2	-1.0°	1.0	0.0		P

Q:\COMMON\CALLAB\CALCHECK.FRM

9/8/95.

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

WORK ORDER

CERTIFICATE # 24952 ASSET # 005121 DATE 08 May 98

ITEM DATA:

Manufacturer Fisherbrand Fisher Model 15-166A

Description Thermometer Serial # CH-183

Accessories

ACTION REQUESTED Cal

CUSTODIAN Dow, Thad Dunn

Turned in by: Phone 6030

CHARGE # 10-1102-571 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 Mixl Date 05/08/98

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

24952

ACTION TAKEN: (Calibration/Repair/Parts) Calibrated Per Procedure

As Found As Left

-0.05°C 0.0°C

CAL ENVIRONMENT:

Temperature 80 °F Humidity 32 %RH

CALIBRATED/REPAIRED:

By [signature] Cal Procedure ASTM E77-88

Date 11 May 98 Accuracy [illegible]

Cal Interval 6 Mos Reliability Code: 3

Next Cal due 11 Nov 98 Cal Time 1.5 Repair Time

Standards used (Asset#) 219, 328

DATE COMPLETED 11 May 98

DATE PICKED UP 5/13/98 PICKED UP BY [signature]

SwRI Form QA-174-0

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

WORK ORDER

CERTIFICATE # 32912 ASSET # 05434 DATE 12 Jan 99

ITEM DATA:

Manufacturer Fisher Brand Model 15-166A

Description Thermometer Serial # 196-783

Accessories

ACTION REQUESTED CW

CUSTODIAN Darrell Dinn, Dv. 20

Turned in by: Phone 6040

CHARGE # 20-1462-571 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 MAC Date 01-12-99

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) 49.9 0 - 50.0 +/- 1°C OK P
99.58 101.0 P

CAL ENVIRONMENT:
Temperature 73 °F Humidity 47 %RH

CALIBRATED/REPAIRED:
By
Date 15 Jan 99 Cal Procedure ASTM E77-98
Accuracy +/- 1°C
Cal Interval 6 Reliability Code:
Next Cal due 15 Jul 99 Cal Time 1 Repair Time
Standards used (Asset#) 217 8174

DATE COMPLETED 15 Jan 99
DATE PICKED UP 2/2/99 PICKED UP BY

SwRI Form QA-174-0

32912

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

WORK ORDER

WORK ORDER # 35664 ASSET # 005434 DATE 16 Aug 99

ITEM DATA:

Manufacturer Fisher Scientific Model 15-166A

Description Thermometer Serial # C96-783

Accessories clear tube case

ACTION REQUESTED cal

CUSTODIAN Div. 20, Darrell Dunn

Turned in by: _____ Phone 6090

CHARGE # 20-OH 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 J.C.L. Date 16 Aug 99

Work involves proprietary/confidential information or equipment ☐ (Yes) ☑ (No)

CONDITION RECEIVED:
_____ Out of tolerance
_____ In tolerance
_____ Damaged (Contact customer)
_____ Contact _____ Date _____
_____ Received into system, introduced or reactivated

ACTION TAKEN: (Calibration/Repair/Parts)

	STarDard	RadioLe
	-18.88	-19.0
	ICE	0.0
	30.77	31.0
	74.65	74.2
	102.03	102.0
	145.14	149.0

CAL ENVIRONMENT:
Temperature 78 °F Humidity 44 %RH

CALIBRATED/REPAIRED:
By [signature] Cal Procedure QL-8 May 99
Date 18 AUG 99 Accuracy ± .5°
Cal Interval 6 Reliability Code 5
Next Cal Due 18 Feb 00 Cal Time 2 Repair Time _____
Standards used (Asset #) 219 328

DATE COMPLETED 18 AUG 99
DATE PICKED UP 8/30/99 PICKED UP BY [signature]

SwRi Form QA-174-0

35664

WORK ORDER 37932

Date Received 2/24/00

Asset No. 005434 **Manufacturer** FISHER SCIENTIFIC **Model** 15-166A
Description THERMOMETER **Serial Number** C96-783
Accessory Received/Required TUBE
Div/CC ID NONE **Accessory to Asset No.** N/A **Accuracy** +/-1 DEG.C
Div/CC DIV20 **Location** B57 **Custodian** DARRELL DUNN **Tel.** 6090
Charge/Project No. 20.00751.006 **Proprietary/Confidental** N **Date Required** ROUTINE
Work Requested CALIBRATION
Receiving Inspection O.K.
Delivered By DARRELL DUNN **Tel.** 6090

WORK HISTORY

Date	Start Time	Stop Time	Notes

Shell Cal-Lab By: jw
CAL: 09/16/99 DUE: 02/16/00
AN: 005434 SN: C96-783

PARTS

Part Name	Part Number	Cost	Failure Description

WORK SUMMARY

Failure Description _____

Repair Action _____

Cal Procedure CL-9 May 99 **Temp** 76 F **Hum** 49 %

Tech [signature] **Cal Hrs.** 1 **Repair Hrs.** _____ **Part Cost** _____

Action Taken Cal

Standards Used 219, 5TH

Date Cal 3-2-00 **Int.** 6 **Mo. Date Due** 9-2-00 **Reliability Code** _____

Date Picked Up 3/22/2000 **Picked Up By** [signature]

workreq.rpt Rev 30 Jan 00

37932

CALIBRATION CHECK FORM

Date Calibrated 7-2-00 Work Order 37932 Cal By [signature]

Procedure No./Date CL-9 May 99 Unit Under Test Thermometer

Mfg. Fisher Model 15-166A SN C96-783 AN 5434

STEP	FUNCTION OR RANGE	APPLIED	TOLERANCE	MEASURED VALUES		P/F
			MIN - MAX	AS FOUND	RELEASED	
		0°C	-1 +1	0°C		P
		41.04	40.44 - 42.44	41.7°C		P
		79.87	78.87 - 80.87	80		P
		139.80	138.80 - 140.80	140.5		P

SwRI Form QA-178 Mar 99 (Previous editions may be used.)

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

2 March 2000

Issued to:	DARRELL DUNN DIV20 B57
Manufacturer/Model:	FISHER SCIENTIFIC 15-166A
Description:	THERMOMETER
Serial Number:	C96-783
Asset Number:	005434

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: 76.0 Degrees Fahrenheit Humidity: 49 % RH

Calibration Date: 2 Mar 00 **Calibration Procedure:** CL-9 MAY99

Condition as Received: IN TOLERANCE

Condition as Released: IN TOLERANCE

Remarks:

Approved by:

Jim Patterson, Supervisor, or Walt Hill, Metrologist

Measurements performed by:

Mack Wood, Technician

Certificate # 37932

m:\a2la.rpt Rev date 14 Dec 99

SOUTHWEST RESEARCH INSTITUTE

Calibration Laboratory

WORK ORDER

Processed by RCRUZ at 8:44:40AM on 10/24/00 I4213

Work Order No 444041087 Arrived 10/24/00

Asset No. 005434 Manufacturer FISHER SCIENTIFIC Model 15-166A

Instrument Type/Class THERMOMETER Serial No. C96-783

Accessory No. Calibration Procedure CL-9 MAY99 Location B57

Div/Client DIV20 Custodian DARRELL DUNN Mail Stop B57 Tel. 6090

Charge/Project No. 20.00751.006 Delivered By / Telephone DARRELL DUNN

IN4CAL Special Instructions _____

WORK NOTES

Date	Hours	Remarks/Notes

REPAIR PARTS

Date	Hours	Part Name	Part Number	Failure Description	Co

WORK SUMMARY

Failure Description _____

Repair Action _____

Calibration Procedure CL-9, MAY99 Temp 75 F Hum. 50 %

Tech VMorales Totals Cal Hours 1.5 Repair Hours _____ Parts Cost _____

Standards Used 219

Date Picked Up 11/6/2000 Picked Up By Darrell Dunn

Southwest Research Institute
Calibration Laboratory

Work Order 4404015	Mfg. FISHER	Tech Morales
Asset No. 5434	Model 15-166A	Procedure CL-9, MAY 99
Serial No. 096-783	Type THERMOMETER	Cal Date 20Oct00

Calibration As Found/As Released Data

Parameter	Standard Reading	UUT As Found	Tolerance	UUT As Released
TEMPERATURE				
0°C	.009°C	0°C	+/- 1°C	
30°C	30.011°C	30.4	+/- 1°C	
60°C	60.000°C	60.1	+/- 1°C	
90°C	90.024°C	90.1	+/- 1°C	
120°C	120.017°C	120.0	+/- 1°C	

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Department of Quality Assurance
Calibration Laboratory

Certificate #
0972-01

Certificate of Calibration

3 November 2000

Issued to:	DARRELL DUNN DIV20 B57
Manufacturer/Model:	FISHER SCIENTIFIC 15-166A
Description:	THERMOMETER
Serial Number:	C96-783
Asset Number:	005434

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: 75.0 Degrees Fahrenheit Humidity: 50 % RH

Calibration Date: 27 Oct 00 **Calibration Procedure:** CL-9 MAY99

Condition as Received: IN TOLERANCE

Condition as Released: IN TOLERANCE

Remarks:

Approved by:

Jim Patterson, Supervisor, or Walt Hill, Metrologist

Measurements performed by:

Vince Morales, Technician

Certificate # 444041087

SOUTHWEST RESEARCH INSTITUTE

Calibration Laboratory

WORK ORDER

Processed by RCRUZ at 2:38:38PM on 4/26/01

Work Order 444043356 **Arrived** 4/26/01

Asset No. 005434 **Manufacturer** FISHER SCIENTIFIC **Model** 15-166A

Instrument Type/Class THERMOMETER **Serial No.** C96-783

Accessory No. **Calibration Procedure** CL-9 MAY99 **Location** B57

Div/Client DIV20 **Custodian** DARRELL DUNN **Mail Stop** B57 **Tel.** 6090

Charge/Project No. 20.00751.006 **Delivered By / Telephone** DARRELL DUNN

IN4CAL **Special Instructions** 20.00751.006

WORK NOTES

Date	Hours	Remarks/Notes
5.1.01	1.0	Calibrate

REPAIR PARTS

Date	Hours	Part Name	Part Number	Failure Description	Cost

WORK SUMMARY

Failure Description None

Repair Action None

Calibration Procedure CL-9, 5/99 **Temp** 72 F **Hum.** 42 %

Tech R Dykes **Totals** **Cal Hours** _____ **Repair Hours** _____ **Parts Cost** _____

Standards Used 5174, 5243

Date Picked Up 5/2/01 **Picked Up By** [signature]

Southwest Research Institute
Calibration Laboratory
Calibration Data Sheet

Work Order 444043356	**Mfr.** Fisher Scientific	**Technician** R Dykstra
Asset No. 005434	**Model** 15-166A	**Procedure** CL-9 5/99
Serial No. C96-783	**Type** Thermometer	**Cal Date** **May. 1, 01**

Remarks: Partial-Immersion 76 mm

Parameter	Applied Value	Found/Left	Instrument Error	Limits	Result
Temperature	-19.987 Deg C	-20.3 Deg C	0.31 Deg C	+/- 1 Deg C	**Passed**
	0.000 Deg C	0.2 Deg C	0.2 Deg C	+/- 1 Deg C	**Passed**
	50.000 Deg C	50.2 Deg C	0.2 Deg C	+/- 1 Deg C	**Passed**
	100.000 Deg C	99.8 Deg C	0.2 Deg C	+/- 1 Deg C	**Passed**
	149.961 Deg C	149.7 Deg C	0.26 Deg C	+/- 1 Deg C	**Passed**

To: rdykstra@qacal@swri30
From: "Darrell Dunn" <ddunn@swri.edu>
Cc:
Subject: RE: Thermometers
Attachment: Headers.822
Date: 5/1/01 11:59 AM

+/- 1 degree is sufficient for our needs. I see no reason to change what we have done in the past.

-----Original Message-----
From: rdykstra@swri.edu (mailto:rdykstra@swri.edu)
Sent: Tuesday, May 01, 2001 10:51 AM
To: ddunn@swri.edu
Cc: WHill@swri.edu
Subject: Thermometers

Darrel, you have 11 Partial-Immersion thermometers in for calibration.

In the past they have been calibrated with an accuracy of +/- 1 Deg C. (Range is -20 to 150 Deg C). Is this accuracy sufficient for your needs?

The reason I am asking is the thermometers are labelled as ASTM 1C thermometers and according to the ASTM the scale error accuracy is +/- 0.5 Deg C.

I do not have all the data collected as of now. I will tell you so far all meet the +/- 1 deg C, not all are meeting the +/- 0.5 deg C spec.

The asset numbers are as follows: 007164, 005434, 007167, 007165, 007169, 005432, 007166, 007168, 003242, 005433, and 007171.

Let me know what accuracy will fit your needs.

Roger Dykstra
Cal Lab. X5076

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

Certificate #
0972-01

Certificate of Calibration

2 May 2001

Issued to: DARRELL DUNN DIV20 B57
Manufacturer/Model: FISHER SCIENTIFIC 15-166A
Description: THERMOMETER
Serial Number: C96-783
Asset Number: 005434
Work Order Number: 444043356

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: 72.0 Degrees Fahrenheit Humidity: 42 % RH

Calibration Date: 1 May 01 **Calibration Procedure:** CL-9 MAY99

Condition as Received: IN TOLERANCE

Condition as Released: IN TOLERANCE

Remarks:

Approved by:

Walt Hill, Supervisor
Institute Calibration Laboratory

Measurements performed by:

Roger Dykstra, Technician

SOUTHWEST RESEARCH INSTITUTE

Calibration Laboratory

WORK ORDER

Received by RCRUZ,10/26/01 11:23:26AM

Arrived 10/26/01 Work Order **444045916**

Asset No 005434 Manufacturer FISHER SCIENTIFIC Model 15-166A

Equipment Type THERMOMETER Serial No. C96-783 Accessory No.

Interval 6 M Calibration Procedure CL-9 MAY99 Location B57

Div/Client DIV20 Custodian DARRELL DUNN Mail Stop B57 Tel 6090

IN4CAL Special Instructions 20.00751.006

Notify before adjustments or repairs. (✓) Provide data with certificate (✓) Certificate Type 7540

Charge/Project No. 00751.006 1.20 Requester / Telephone

This information is correct for the work requested.

WORK NOTES

Date	Hours	Remarks/Notes
10/30	1.5	Cal

Date	Hours	Part Name	Part Number	Failure Description	Cost
n/a					

7184

WORK SUMMARY

Failure Description n/a

Repair Action n/a

Tech RDyksta Cal Hrs. 1.5 Repair Hrs ___ Parts Cost ___ Temp 76 F Hum. 44 %

Standards Used 5179, 5243

Date Picked Up 11/16/01 Picked Up By

Southwest Research Institute
Calibration Laboratory
Calibration data sheet

Work Order:	**444045916**	**Mfr.**	**Fisher Scientific**	**Technician**	**Roger Dykstra**
Asset No.	**005434**	**Model**	**15-166A**	**Procedure**	**CL-9, 5/99**
Serial No.	**C96-783**	**Type.**	**Thermometer**	**Cal Date.**	**10/30/01**

Remarks: The reported uncertainty is based on a standard uncertainty multiplied by a coverage Factor of k=2, which provides a level of confidence of approximately 95 %. The test limits are specified in the procedure. The test points are per the ASTM 1C table.

Parameter	Test Point	As Found / As left	Error	Test Limits	Uncertainty
Temperature	-19.89	-20.4	-0.51	1	0.2
Degree C	0.10	0.0	-0.10	1	0.2
	50.03	49.8	-0.23	1	0.2
	99.95	99.2	-0.75	1	0.2
	149.97	150.0	0.03	1	0.2

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

Certificate of Calibration

30 October 2001

Issued to:	DARRELL DUNN DIV20 B57
Manufacturer/Model:	FISHER SCIENTIFIC 15-166A
Description:	THERMOMETER
Serial Number:	C96-783
Asset Number:	005434
Work Order Number:	444045916

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: 76.0 Degrees Fahrenheit Humidity: 44 % RH

Calibration Date: 30 Oct 01 **Calibration Procedure:** CL-9 MAY99

Condition as Received: IN TOLERANCE

Condition as Received: IN TOLERANCE

Remarks:

Approved by:

Walt Hill, Supervisor
Institute Calibration Laboratory

Measurements performed by:

Roger Dykstra, Technician

SOUTHWEST RESEARCH INSTITUTE

Calibration Laboratory

WORK ORDER

Received by RCRUZ,4/17/02 4:03:18PM

Arrived 4/17/02 Work Order **444048238**

Asset No. 005434 Manufacturer FISHER SCIENTIFIC Model 15-166A

Equipment Type THERMOMETER Serial No. C96-783 Accessory No.

Interval 6 M Calibration Procedure CL-9 MAY99 Location B57

Div/Client DIV20 Custodian DARRELL DUNN Mail Stop B57 Tel 6090

IN LINE Special Instructions 20.00751.006

Notify before adjustments or repairs. ( ) Provide data with certificate (✓) Certificate Typ

Charge/Project No. 00751.006 1.20 Requester / Telephone DARRELL DUNN X6090

This information is correct for the work requested. Darrell Dunn

WORK NOTES

Date	Hours	Remarks/Notes
4/22/02	1.0	cal

Date	Hours	Part Name	Part Number	Failure Description	Cost
N/A					

48238

WORK SUMMARY

Failure Description N/A

Repair Action N/A

Tech RDyKSR Cal Hrs. ___ Repair Hrs ___ Parts Cost ___ Temp 74 F Hum. 55 %

Standards Used 5243 due 12/3/02

5174 due 8/16/03

Date Picked Up 5/9/02 Picked Up By Darrell Dunn

Southwest Research Institute
Calibration Laboratory
Calibration Data Sheet Z 540

As found / left data

Workorder 444048238	**Mfr.** Fisher Scientific	**Technician**	R Dykstra
Asset #. 005434	**Model** 15-166A	**Procedure**	CL-9, 5/99
Serial #. C96-783	**Type** Thermometer	**Cal Date**	4/22/02

Remarks: The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor (k=2) providing a level of confidence of approximately 95%.
The Difference is equal to TI reading - Std reading.
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.

Range Degree C	Test point Degree C	TI Reading Degree C	Difference Degree C	Tolerance Degree C	Uncertainty Degree C	Results
0 to 150	-19.89	-20.4	-0.51	1	0.35	Pass
	0.10	0.0	-0.10	1	0.35	Pass
	50.00	49.8	-0.20	1	0.35	Pass
	99.94	99.2	-0.74	1	0.35	
	149.90	149.6	-0.30	1	0.35	Pass

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

Certificate of Calibration

22 April 2002

Issued to:	DARRELL DUNN DIV20 B57
Manufacturer/Model:	FISHER SCIENTIFIC 15-166A
Description:	THERMOMETER
Serial Number:	C96-783
Asset Number:	005434
Work Order Number:	444048238

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: 74.0 Degrees Fahrenheit Humidity: 55 % RH

Calibration Date: 22 Apr 02 **Calibration Procedure:** CL-9 MAY99

Condition as Received: SEE ATTACHED DATA

Condition as Returned: SEE ATTACHED DATA

Remarks:

Approved by:

Walt Hill, Metrology Group Leader
Institute Calibration Laboratory

Measurements performed by:

Roger Dykstra, Technician