

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

WORK ORDER

CERTIFICATE # 33566 ASSET # 007167 DATE 19 MAR 99

ITEM DATA:

Manufacturer Fisherbrand Model 15-166  
Description Thermometer Serial # A98182  
Accessories Tube

ACTION REQUESTED 01

CUSTODIAN DIV. 20, Daniel Dunn

Turned in by: \_\_\_\_\_ Phone 6070

CHARGE # 20. 448-571-04 03/10 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 MM Date 03-05-99

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) 6 Point Cal

CAL ENVIRONMENT:  
Temperature 74°F Humidity 49 %RH

CALIBRATED/REPAIRED:  
By MM Wood Cal Procedure T033K5-4-42-1 ARR97  
Date 3-17-99 Accuracy ± 1.0 °C  
Cal Interval 12 mo Reliability Code: \_\_\_\_\_  
Next Cal due 3-17-00 Cal Time 1h Repair Time \_\_\_\_\_  
Standards used (Asset#) 000219

DATE COMPLETED 3-17-99  
DATE PICKED UP 3/18/99 PICKED UP BY [Signature]

33566



# WORK ORDER 38586

Date Received 4/10/00

Asset No. 007167 Manufacturer FISHER SCIENTIFIC Model 15-166A  
Description THERMOMETER Serial Number H98-182  
Accessory Received/Required CONTAINER  
Div/CC ID NONE Accessory to Asset No. N/A Accuracy \_\_\_\_\_ Mfg. Tol. \_\_\_\_\_  
Div/CC DIV20 Location B57 Custodian DARRELL DUNN Tel. 6090  
Charge/Project No. 20.00751.006 Proprietary/Confidential 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

SwRI Cal-Lab By  
CAL: 03/17/99 DUE: 03/1  
AN: 007167 SN: H98-182

## PARTS

Part Name	Part Number	Cost	Failure Description

38586

## WORK SUMMARY

Failure Description \_\_\_\_\_  
Repair Action \_\_\_\_\_  
Cal Procedure CC-9 5799 Temp 76 F Hum 48 %  
Tech [Signature] Cal Hrs. 1 Repair Hrs. \_\_\_\_\_ Part Cost \_\_\_\_\_  
Action Taken Cal  
Standards Used 0219 5774  
Date Cal 4-18-00 Int. 12 Mo. Date Due 4-18-01 Reliability Code 2  
Date Picked Up 5/2/00 Picked Up By [Signature]



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

18 April 2000

**Issued to:** DARRELL DUNN DIV20 B57  
**Manufacturer/Model:** FISHER SCIENTIFIC 15-166A  
**Description:** THERMOMETER  
**Serial Number:** H98-182  
**Asset Number:** 007167

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: 48 % RH

**Calibration Date:** 18 Apr 00 **Calibration Procedure:** CL-9 5/99

**Condition as Received:** IN TOLERANCE

**Condition as Released:** IN TOLERANCE

**Remarks:**

Approved by:

\_\_\_\_\_  
Jim Patterson, Supervisor, or Walt Hill, Metrologist

Certificate # 38586

m:\a2la.rpt Rev date 14 Dec 99

Measurements performed by:

\_\_\_\_\_  
Mack Wood, Technician

Page 1 of 1



# SOUTHWEST RESEARCH INSTITUTE

## Calibration Laboratory

### WORK ORDER

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

1 10010 0001 0001 0001 0001 0001 0001

**Work Order 444043345**

Arrived 4/26/01

Asset No. 007167 Manufacturer FISHER SCIENTIFIC

Model 15-166A

Instrument Type/Class THERMOMETER

Serial No. H98-182

Accessory No. Calibration Procedure CL-9 5/99

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
<u>5-1-01</u>	<u>1.0</u>	<u>Calibration</u>
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

### REPAIR PARTS

Date	Hours	Part Name	Part Number	Failure Description	Cost
<u>N/A</u>	<u>→</u>	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____

### WORK SUMMARY

Failure Description None

Repair Action None

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

Tech R Dykeman Totals Cal Hours \_\_\_\_\_ Repair Hours \_\_\_\_\_ Parts Cost \_\_\_\_\_

Standards Used \$179, \$243

Date Picked Up 5/2/01

Picked Up By [Signature]

444043345



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  
6220 Culebra Road  
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:** H98-182  
**Asset Number:** 007167  
**Work Order Number:** 444043345

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 5/99

**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, 5/9/02 9:18:19AM

Arrived 5/9/02

Work Order **444048465**

Asset No. 007167 Manufacturer FISHER SCIENTIFIC

Model 15-166A

Equipment Type THERMOMETER

Serial No. H98-182

Accessory No.

Interval 12 M

Calibration Procedure CL-9 5/99

Location B57

Div/Client DIV20

Custodian DARRELL DUNN

Mail Stop B57

Tel 6090

**IN LINE**

Special Instructions \_\_\_\_\_

Notify before adjustments or repairs. ( ) Provide data with certificate (  ) Certificate Type \_\_\_\_\_

Charge/Project No. 00751.006 1.20

Requester / Telephone \_\_\_\_\_

This information is correct for the work requested.

### WORK NOTES

Date	Hours	Remarks/Notes
<u>5/9/02</u>	<u>1.0</u>	<u>cal</u>
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

Date	Hours	Part Name	Part Number	Failure Description	Cost
<u>n/a</u>	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____

### WORK SUMMARY

Failure Description n/a

Repair Action n/a

Tech R Dykstra Cal Hrs. 1.0 Repair Hrs \_\_\_\_\_ Parts Cost \_\_\_\_\_ Temp 74 F Hum. 55 %

Standards Used S243 due 12/3/02

S174 due 3/18/03

Date Picked Up 6/6/02 Picked Up By Darrell Dunn

48465

**Southwest Research Institute  
Calibration Laboratory  
Calibration Data Sheet**

**Workorder 444048465**  
**Asset #. 007167**  
**Serial #. H98-182**

**Mfr. Fisher Scientific**  
**Model 15-166A**  
**Type Thermometer**

**Technician R Dykstra**  
**Procedure CL-9, 5/99**  
**Cal Date 5/9/02**

**Ambient Conditions:**

**Temperature 74 Degree F**  
**Humidity 55 % R.H.**  
**Baro. Pressure N/A PSIA**

**Data sheet Revision:**

**Revision 0 2/21/02**

**Standards used:**

<b>Asset #</b>	<b>Due Date</b>	<b>Nomenclature</b>
005243	12/03/02	H.P. 34420A Digital Multi-Meter
005174	02/18/03	RTD probe

**Is statement of compliance to a specification requested. Yes**  
**(if statement is required, print yes otherwise leave blank)**

**Tolerance 1.00 Degree C Range -20 to 150 Degree C**  
**(if not required leave blank)**

<b>Degree C</b>	<b>Degree C</b>	<b>Degree C</b>	<b>Degree C</b>	<b>Degree C</b>	
	<b>As Found</b>				
<b>Std Reading</b>	<b>TI Reading</b>	<b>Error</b>	<b>Test Limits</b>	<b>Uncertainty</b>	<b>Results</b>
-19.89	-20.2	-0.31	1	0.35	Pass
0.10	0.0	-0.10	1	0.35	Pass
50.00	50.4	0.40	1	0.35	Pass
99.94	100.0	0.06	1	0.35	Pass
149.90	149.0	-0.90	1	0.35	

**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%.

If compliance testing to a specification is requested. The results can be pass, fail, or if blank "Not determinable". If results are not determinable it is to end user to determine if results meet thier needs.

If compliance testing to a specification is not requested, only data and uncertainty will be given on data sheet.



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

## Certificate of Calibration

10 May 2002

**Issued to:** DARRELL DUNN DIV20 B57  
**Manufacturer/Model:** FISHER SCIENTIFIC 15-166A  
**Description:** THERMOMETER  
**Serial Number:** H98-182  
**Asset Number:** 007167  
**Work Order Number:** 444048465

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:** 10 May 02 **Calibration Procedure:** CL-9 5/99

**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