

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

WORK ORDER

CERTIFICATE # 33567 ASSET # 007166 DATE 05 March 99

ITEM DATA:

Manufacturer Fischerbrand Model 15-166A
Description Thermometer Serial # H98-170
Accessories tab

ACTION REQUESTED MI

CUSTODIAN Div. 20, Darrell Dunn

Turned in by: _____ Phone 6090

CHARGE # 20-4402 SA/OK 03/2 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 MMJ Date 03/18/99

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: MMJ
By _____ Cal Procedure TD33K5-4-42-1 AIR97
Date 3-17-99 Accuracy ±1.0°C
Cal Interval 12mo 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 Dunn

33567

WORK ORDER 38591

Date Received 4/10/00

Asset No. 007166 Manufacturer FISHER SCIENTIFIC Model 15-166A
 Description THERMOMETER Serial Number H98-170
 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 |
|------|------------|-----------|-------|
| | | | |
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PARTS

| Part Name | Part Number | Cost | Failure Description |
|-----------|-------------|------|---------------------|
| | | | |
| | | | |
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| | | | |
| | | | |
| | | | |
| | | | |
| | | | |

38591

WORK SUMMARY

Failure Description _____

Repair Action _____

Cal Procedure CL-9 5/99 Temp 76 F Hum. 48 %

Tech [Signature] Cal Hrs. 1 Repair Hrs. _____ Part Cost _____

Action Taken Cal

Standards Used 0219 5174

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: H98-170
Asset Number: 007166

This certifies the above item was calibrated in compliance with MIL-STD-45662A and ANSI/NC SL 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 # 38591

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

Work Order **444043348**

Arrived 4/26/01

Asset No. 007166

Manufacturer FISHER SCIENTIFIC

Model 15-166A

Instrument Type/Class THERMOMETER

Serial No. H98-170

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>5-3</u> | <u>1.5</u> | <u>Calibrate</u> |
| | | |
| | | |
| | | |
| | | |

REPAIR PARTS

| Date | Hours | Part Name | Part Number | Failure Description | Cost |
|------------|-----------|-----------|-------------|---------------------|------|
| <u>5-3</u> | <u>.5</u> | | | | |
| | | | | | |
| | | | | | |
| | | | | | |

WORK SUMMARY

Failure Description Column separated

Repair Action Re-union mercury column

Calibration Procedure CL-9, May 99 Temp 72 F Hum. 42 %

Tech B. Dykstra Totals Cal Hours 1.5 Repair Hours 0.5 Parts Cost _____

Standards Used 517A, 5243

Date Picked Up 5/8/01

Picked Up By Darrell Dunn

43348

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: WWill@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

3 May 2001

Issued to: DARRELL DUNN DIV20 B57
Manufacturer/Model: FISHER SCIENTIFIC 15-166A
Description: THERMOMETER
Serial Number: H98-170
Asset Number: 007166
Work Order Number: 444043348

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.

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Ambient Conditions: Temperature: 72.0 Degrees Fahrenheit Humidity: 42 % RH

Calibration Date: 3 May 01 **Calibration Procedure:** CL-9 5/99

Condition as Received: OUT OF 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 **444048464**

Asset No. 007166 Manufacturer FISHER SCIENTIFIC

Model 15-166A

Equipment Type THERMOMETER

Serial No. H98-170

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 Typ _____

Charge/Project No. 00751.006 1.20

Requester / Telephone _____

This information is correct for the work requested.

Darrell Dunn

WORK NOTES

Date Hours Remarks/Notes

5/9/02 1.0 cal

Date Hours Part Name Part Number Failure Description Cost

n/h

48464

WORK SUMMARY

Failure Description n/h

Repair Action n/h

Tech R. Dyken Cal Hrs. 1.0 Repair Hrs _____ Parts Cost _____ Temp 74 F Hum. 55 %

Standards Used 5243 due 12/3/02

517A due 3/18/03

Date Picked Up 6/6/2002

Picked Up By Darrell Dunn

Southwest Research Institute
Calibration Laboratory
Calibration Data Sheet

Workorder 444048464
Asset #. 007166
Serial #. H98-170

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:

| Asset # | Due Date | Nomenclature |
|---------|----------|---------------------------------|
| 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)

| Degree C | Degree C | Degree C | Degree C | Degree C | |
|-------------|------------|----------|-------------|-------------|---------|
| Std Reading | TI Reading | Error | Test Limits | Uncertainty | Results |
| -19.88 | -20.4 | -0.52 | 1 | 0.35 | Pass |
| 0.09 | 0.0 | -0.09 | 1 | 0.35 | Pass |
| 50.00 | 50.0 | 0.00 | 1 | 0.35 | Pass |
| 99.94 | 99.6 | -0.34 | 1 | 0.35 | Pass |
| 149.90 | 150.0 | 0.10 | 1 | 0.35 | Pass |

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
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(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: H98-170
Asset Number: 007166
Work Order Number: 444048464

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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: IN TOLERANCE

Condition as Returned: IN TOLERANCE

Remarks:

Approved by:


Walt Hill, Metrology Group Leader
Institute Calibration Laboratory

Measurements performed by:


Roger Dykstra, Technician