

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

WORK ORDER

CERTIFICATE # 33569 ASSET # 001164 DATE 05 March 99

ITEM DATA:

Manufacturer Fisherbrand Model 15-166A
Description Thermometer Serial # C98-106
Accessories tube

ACTION REQUESTED Cal

CUSTODIAN D.W. D., Daniel Duan

Turned in by: _____ Phone 6090

CHARGE # 20-4404-571 OH 03/12 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 [Signature] 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 [Signature] Cal Procedure T033K5-4-42-1 APR 97

Date 3-17-99 Accuracy ±1.0°C

Cal Interval 2ms 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]

33569

CALIBRATION CHECK FORM

Date Calibrated 3-16-99

Work Order 33569

Rev _____ Chg _____
Page _____ of _____

Technician AMW

Unit Under Test Thermometer

Manufacturer Fisher

Model 15-166A

SN 098-106 ASN 7164

STEP	FUNCTION OR RANGE 0-150°C	APPLIED °C	TOLERANCE	MEASURED VALUES		PT
			MIN - MAX (±1°C)	AS FOUND	RELEASED	
1		0.012	-0.987 - 1.012	0	Same	P
2		29.92	28.92 - 30.92	30.0	↓	P
3		59.10	58.10 - 60.10	59.2		P
4		90.00	89.00 - 91.00	90.5		P
5		119.93	118.93 - 120.93	121.0		P
6		147.88	146.88 - 148.88	148.5		P
			Intol			

WORK ORDER 38587

Date Received 4/10/00

Asset No. 007164 Manufacturer FISHER SCIENTIFIC Model 15-166A
 Description THERMOMETER Serial Number C98-106
 Accessory Received/Required NONE 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

Cal Lab By: mmw
 3/17/99 DUE: 03/17/00
 7164 SN: C98-106
 BY DUNN HARRIS HARRIS DUNN HARRIS HARRIS

38587

PARTS

Part Name	Part Number	Cost	Failure Description

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 [Signature]
 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]

CALIBRATION CHECK FORM

Date Calibrated 4-18-00

Work Order 38587

Cal By [Signature]

Procedure No./Date CL-9 5/99 Unit Under Test ASTM 1C Thermometer

Mfg. Fisher Model 15-166A SN C98-106 AN 7164

STEP	FUNCTION OR RANGE	APPLIED	TOLERANCE	MEASURED VALUES		P/F
			MIN - MAX	AS FOUND	RELEASED	
	Temp °C		± 1°C			
	Norm					
1	-20		-17.75	-18.0		
2	0	0		0.0		
3	50	51.93		52.3		
4	100	99.84		100.8		
5	150	140.54		140.6		



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

18 April 2000

Issued to: DARRELL DUNN DIV20 B57
Manufacturer/Model: FISHER SCIENTIFIC 15-166A
Description: THERMOMETER
Serial Number: C98-106
Asset Number: 007164

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 # 38587

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 **444043347**

Arrived 4/26/01

Asset No. 007164 Manufacturer FISHER SCIENTIFIC Model 15-166A

Instrument Type/Class THERMOMETER Serial No. C98-106

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>5-2</u>	<u>1.0</u>	<u>Calibrate</u>
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

REPAIR PARTS

Date	Hours	Part Name	Part Number	Failure Description	Cost
<u>4/18</u>	<u>4/18</u>	<u>4/18</u>	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____

WORK SUMMARY

Failure Description None

Repair Action None

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

Tech R Dyston Totals Cal Hours 1.0 Repair Hours 0 Parts Cost _____

Standards Used 5174, 5243

Date Picked Up 5/2/01 Picked Up By [Signature]

43347

To: rdykstra@gacal@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
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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: C98-106
Asset Number: 007164
Work Order Number: 444043347

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: 48 % 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, 4/17/02 4:03:18PM

Arrived 4/17/02

Work Order **444048233**

Asset No. 007164 Manufacturer FISHER SCIENTIFIC

Model 15-166A

Equipment Type THERMOMETER

Serial No. C98-106

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 DARRELL DUNN X6090

This information is correct for the work requested.

WORK NOTES

Date	Hours	Remarks/Notes
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

Date	Hours	Part Name	Part Number	Failure Description	Cost
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____

WORK SUMMARY

Failure Description _____

Repair Action _____

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

Standards Used 5243 due 12/2/02

517A due 2/18/03

Date Picked Up 5/9/02

Picked Up By Darrell Dunn

48233

Southwest Research Institute
 Calibration Laboratory
 Calibration Data Sheet

As found / left data

Workorder 444048233	Mfr. Fisher Scientific	Technician	R Dykstra
Asset #. 007164	Model 15-166A	Procedure	CL-9, 5/99
Serial #. C98-106	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	Test point	TI Reading	Difference	Tolerance	Uncertainty	Results
Degree C	Degree C	Degree C	Degree C	Degree C	Degree C	
0 to 150	-19.88	-20.2	-0.32	1	0.35	Pass
	0.09	0.4	0.31	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	



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Calibration Laboratory

Certificate of Calibration

22 April 2002

Issued to: DARRELL DUNN DIV20 B57
Manufacturer/Model: FISHER SCIENTIFIC 15-166A
Description: THERMOMETER
Serial Number: C98-106
Asset Number: 007164
Work Order Number: 444048233

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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: 22 Apr 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