

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

WORK ORDER

CERTIFICATE # 33568 ASSET # 007165 DATE 05 March 99

ITEM DATA:

Manufacturer Fisherbrand Model 15-166A
Description thermometer Serial # H 98-167
Accessories tip

ACTION REQUESTED Cal

CUSTODIAN DU 20 Daniel Dunn

Turned in by: _____ Phone 6046

CHARGE # 20-1164-541-04 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 MAW 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: OML/val
By _____ Cal Procedure T033165-4-42-1 APR 97
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]

33568

CALIBRATION CHECK FORM

Date Calibrated 3-16-99 Work Order 33568 Rev _____ Chg _____
 Technician AMW Page _____ of _____
 Unit Under Test Thermometer
 Manufacturer Fisher Model 15-166A SN 1498-187 ASN 7165

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	-0.1	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	148.7		P
			INTOL			

WORK ORDER 38585

Date Received 4/10/00

Asset No. 007165 Manufacturer FISHER SCIENTIFIC Model 15-166A
 Description THERMOMETER Serial Number H98-187
 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

Seal Cal-Lab By _____
 CAL: 03/17/99 DUE: 03/1
 AN: 007166 SN: H98-187
 I KNOW WHAT I'M DOING

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 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]

38585

CALIBRATION CHECK FORM

Date Calibrated 4-18-00

Work Order 38585

Cal By 

Procedure No./Date CL-9 5/99

Unit Under Test ASTM 1C Thermometer

Mfg. Fisher

Model 15-166A

SN H98-187 AN 7165

STEP	FUNCTION OR RANGE	APPLIED	TOLERANCE	MEASURED VALUES		P/F
			MIN - MAX	AS FOUND	RELEASED	
	Temp °C		± 1°C			
	Nom					
1	-20		-17.63	-18.2		
2	0	0		-0.5		
3	50	51.94		52.0		
4	100	99.83		100.2		
5	150	140.43		140.9		



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: H98-187
Asset Number: 007165

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

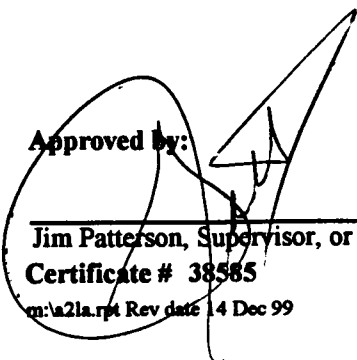
Calibration Date: 18 Apr 00 **Calibration Procedure:** CL-9 5/99

Condition as Received: IN TOLERANCE

Condition as Released: IN TOLERANCE

Remarks:


Approved by:



Jim Patterson, Supervisor, or Walt Hill, Metrologist
Certificate # 38585

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 444043353

Arrived 4/26/01

Asset No. 007165 Manufacturer FISHER SCIENTIFIC Model 15-166A

Instrument Type/Class THERMOMETER Serial No. H98-187

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>	<u>N/A</u>			

WORK SUMMARY

Failure Description Column Separation

Repair Action Re-UNITED mercury column

Calibration Procedure CL-9, 5/99 Temp 70 F Hum. 42 %

Tech R Dykstra Totals Cal Hours 1.5 Repair Hours 5 Parts Cost _____

Standards Used 5174 RD
7157, 5243

Date Picked Up 5/8/01

Picked Up By [Signature]

444043353

Southwest Research Institute

Calibration Laboratory

Calibration Data Sheet

Work Order 444043353	Mfr. Fisher Scientific	Technician R Dykstra			
Asset No. 007165	Model 15-166A	Procedure CL-9, MAY 99			
Serial No. H98-187	Type Thermometer	Cal Date May. 3, 01			
Remarks: A.L. taken after column of liquid re-united.					
Parameter	Applied Value	As Left	Instrument Error	Limits	Result
Temperature	-19.626 Deg C	-20.0 Deg C	0.38 Deg C	+/- 1 Deg C	Passed
	0.034 Deg C	-0.0 Deg C	0.034 Deg C	+/- 1 Deg C	Passed
	50.082 Deg C	50.0 Deg C	0.09 Deg C	+/- 1 Deg C	Passed
	99.958 Deg C	99.5 Deg C	0.45 Deg C	+/- 1 Deg C	Passed
	149.914 Deg C	149.0 Deg C	0.91 Deg C	+/- 1 Deg C	Passed

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: 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



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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: H98-187
Asset Number: 007165
Work Order Number: 444043353

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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, 8/22/01 8:35:28AM

Arrived 8/22/01

Work Order **444044943**

Asset No. 007165 Manufacturer FISHER SCIENTIFIC

Model 15-166A

Instrument Type/Class THERMOMETER

Serial No. H98-187

Accessory No.

Calibration Procedure CL-9 5/99

Location B57

Div/Client DIV20

Custodian DARRELL DUNN

Mail Stop B57

Tel. 6090

IN4CAL

Special Instructions _____

Notify before making adjustments or repairs. Provide measurement readings

Charge/Project No. 00751.006 1.20

Requested By / Telephone

The above is correct for the work requested.

Darrell Dunn

WORK NOTES

Date	Hours	Remarks/Notes
<u>8/23</u>	<u>1.0</u>	<u>Calibration</u>
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

Lab By: rjk
31 NOT ON RECALL
N: 180-107

SWRI Call
SI

44943

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

WORK SUMMARY

Failure Description n/a

Repair Action n/a

Calibration Procedure CL-9, 5/99

Temp 74F Hum. 57%

Tech R Dykstra Totals Cal Hours 1.0 Repair Hours _____

Parts Cost _____

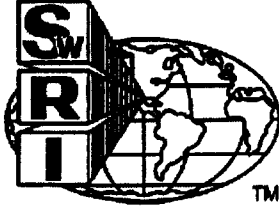
Standards Used 0219, 0328

Date Picked Up 9/4/01

Picked Up By Darrell Dunn

	STD	T1
-20	-19.553 °C	-20.6 °C
0	-0.115 °C	0.0 °C
50	49.938 °C	50.0 °C
100	99.947 °C	99.6 °C
150	149.983 °C	149.6 °C

55553



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Department of Quality Assurance
Calibration Laboratory



Certificate of Calibration

23 August 2001

Issued to: DARRELL DUNN DIV20 B57
Manufacturer/Model: FISHER SCIENTIFIC 15-166A
Description: THERMOMETER
Serial Number: H98-187
Asset Number: 007165
Work Order Number: 444044943

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Ambient Conditions: Temperature: 74.0 Degrees Fahrenheit Humidity: 57 % RH

Calibration Date: 23 Aug 01 **Calibration Procedure:** CL-9 5/99

Condition as Received: SEE ATTACHED DATA

Condition as Released: SEE ATTACHED DATA

Remarks:

Approved by:

Walt Hill, Supervisor
Institute Calibration Laboratory

Measurements performed by:

Roger Dykstra, Technician