

# WORK ORDER 39565

Date Received 6/26/00

Asset No. 008108 Manufacturer FISHER SCIENTIFIC Model 15-166A  
 Description THERMOMETER Serial Number A2000-123  
 Accessory Received/Required NONE  
 Div/CC ID NONE Accessory to Asset No. N/A  
 Div/CC DIV20 Location B57 Custodian DARRELL DUNN Tel. 6090  
 Charge/Project No. 30.00851.006 Proprietary/Confidential N Date Required ROUTINE  
 Work Requested CALIBRATION  
 Receiving Inspection NEW ITEM.  
 Delivered By FISHER Tel. 6090

## WORK HISTORY

Date	Start Time	Stop Time	Notes
			Standard Temp Reading ( $\pm 2^\circ$ )
			-20.51 -20.5
			+20.67 +21.0
			+65.10 +65.0 +68.5
			+105.01 105.2
			+150.50 151.0

## PARTS

Part Name	Part Number	Cost	Failure Description

## WORK SUMMARY

Failure Description \_\_\_\_\_

Repair Action \_\_\_\_\_

Cal Procedure CL-9 MAY 99 Temp 74 F Hum 50 %

Tech DW Cal Hrs. 1 Repair Hrs. \_\_\_\_\_ Part Cost \_\_\_\_\_

Action Taken \_\_\_\_\_

Standards Used 5243 5174

Date Cal 29 JUN 2000 Int. 6 Mo. Date Due \_\_\_\_\_ Reliability Code 1

Date Picked Up 6/30/2000 Picked Up By [Signature]

39565



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

29 June 2000

**Issued to:** DARRELL DUNN DIV20 B57  
**Manufacturer/Model:** FISHER SCIENTIFIC 15-166A  
**Description:** THERMOMETER  
**Serial Number:** A2000-123  
**Asset Number:** 008108

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: 74.0 Degrees Fahrenheit Humidity: 50 % RH

**Calibration Date:** 29 Jun 00 **Calibration Procedure:** CL-9 5/99

**Condition as Received:** In Tolerance

**Remarks:**

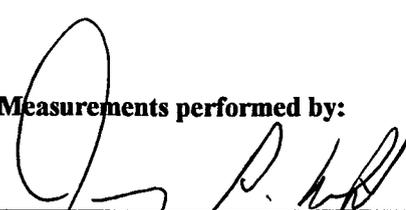
**Approved by:**

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

Certificate # 39565

m:\a2la.rpt Rev date 22 May 00

**Measurements performed by:**

  
\_\_\_\_\_  
Jerfy White, Technician

Page 1 of 1

# SOUTHWEST RESEARCH INSTITUTE

## Calibration Laboratory

### WORK ORDER

Processed by RCRUZ at 3:52:24PM on 1/19/01

||||| ||||| ||||| ||||| ||||| ||||| |||||

**Work Order 444042124**

Arrived 1/19/01

Asset No. 008108 Manufacturer FISHER SCIENTIFIC

Model 15-166A

Instrument Type/Class THERMOMETER

Serial No. A2000-123

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

**IN4CAL**

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

### WORK NOTES

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

### REPAIR PARTS

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

### WORK SUMMARY

Failure Description \_\_\_\_\_

Repair Action \_\_\_\_\_

Calibration Procedure CL-9, 5/99 Temp 74 F Hum. 36 %

Tech J. Morales Totals Cal Hours 1.0 Repair Hours \_\_\_\_\_ Parts Cost \_\_\_\_\_

Standards Used 219

Date Picked Up 1/31/2001 Picked Up By Darrell Dunn

42124





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San Antonio, TX 78238  
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Department of Quality Assurance  
Calibration Laboratory



Certificate #  
0972-01

## Certificate of Calibration

29 January 2001

**Issued to:** DARRELL DUNN DIV20 B57  
**Manufacturer/Model:** FISHER SCIENTIFIC 15-166A  
**Description:** THERMOMETER  
**Serial Number:** A2000-123  
**Asset Number:** 008108  
**Work Order Number:** 444042124

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: 74.0 Degrees Fahrenheit Humidity: 36 % RH

**Calibration Date:** 29 Jan 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:**

Vince Morales, Technician







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

23 August 2001

**Issued to:** DARRELL DUNN DIV20 B57  
**Manufacturer/Model:** FISHER SCIENTIFIC 15-166A  
**Description:** THERMOMETER  
**Serial Number:** A2000-123  
**Asset Number:** 008108  
**Work Order Number:** 444044942

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: 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

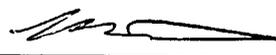
**Remarks:**

**Approved by:**

  
\_\_\_\_\_

Walt Hill, Supervisor  
Institute Calibration Laboratory

**Measurements performed by:**

  
\_\_\_\_\_

Roger Dykstra, Technician



Southwest Research Institute  
Calibration Laboratory  
Calibration Data Sheet

Workorder 444047216  
Asset #. 008108  
Serial #. A2000-123

Mfr. Fisher Scientific  
Model 15-166A  
Type Thermometer

Technician R Dykstra  
Procedure CL-9, 5/99  
Cal Date 2/22/01

**Ambient Conditions:**

Temperature 75 Degree F  
Humidity 28 % 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
-19.92	-20.4	-0.48	1	0.35	Pass
0.09	0.4	0.31	1	0.35	Pass
50.06	50.4	0.34	1	0.35	Pass
99.94	100.4	0.46	1	0.35	Pass
149.91	149.8	-0.11	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.

The tolerance is given in procedure and on previous data sheets.

**Measurement uncertainty Budget for Degree C thermometers.**

The following are assumptions and estimates used in the measurement uncertainty budget.

a.) Able to read the thermometer to a resolution of 1/5 smallest inc. with the aid of a magnifier.

b.) Repeatability is not significant.

**c.) Bath stability & gradients for the Various Baths**

Model 7030 (-30 to 150 C)	0.01	Degree C
Model 6055 (200 to 550 C)	0.01	Degree C
Model 6035 (30 to 300 C)	0.01	Degree C

**d.) The best Uncertainty for Hart 5699 SPRT w/ HP 34420**

-200 to 420 C	0.0033	Degree C
420 to 660 C	0.004	Degree C

e.) Used the worst case from d above in budget.

	Units	Range	Accuracy +/-	Resolution
	Degree C	-20 to 150	1	0.2
Source of uncertainty	Value +/- Deg C	Distribution	Divisor	Standard Uncertainty Deg C
Standard	0.004	Normal	1	0.00
Bath Stability	0.01	Rectangular	Sqrt 3	0.01
Repeatability	0	Normal	1	0.00
Instrument Resolution	0.2	Rectangular	2*Sqrt 3	0.17
Combined Uncertainty			RSS	0.17
Expanded Uncertainty			K=2	0.3



Southwest Research Institute  
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Calibration Laboratory

## Certificate of Calibration

22 February 2002

**Issued to:** DARRELL DUNN DIV20 B57  
**Manufacturer/Model:** FISHER SCIENTIFIC 15-166A  
**Description:** THERMOMETER  
**Serial Number:** A2000-123  
**Asset Number:** 008108  
**Work Order Number:** 444047216

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: 75.0 Degrees Fahrenheit Humidity: 28 % RH

**Calibration Date:** 22 Feb 02 **Calibration Procedure:** CL-9 5/99

**Condition as Received:** IN TOLERANCE

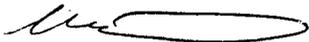
**Condition as Returned:** IN TOLERANCE

**Remarks:** COMPLIANCED TESTED THERMOMETER TO A SPECIFICATION OF +/- 1 DEGREE C OVER A -20 TO 150 DEGREE C RANGE.

**Approved by:**

  
Walt Hill, Supervisor  
Institute Calibration Laboratory

**Measurements performed by:**

  
Roger Dykstra, Technician