



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 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/NCCL 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

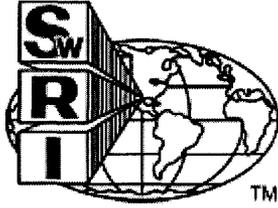
Remarks:

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/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: 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™

6220 Culebra Road, P.O. Drawer 28510
Institute Quality Systems
Institute Calibration Laboratory
Phone: 210-522-5215 Fax 210-522-3692

Certificate of Calibration

Submitted By: DIV20
Address: B57
Contact: DARRELL DUNN
Manufacturer Model: FISHER SCIENTIFIC 15-166A
Description: THERMOMETER
Serial No: A2000-123
Asset No: 008108
Procedure: CL-9, 5/99

Work Order: 444050125
Date Issued: Sep 17, 2002
Calibration Date: Sep 17, 2002
****Calibration Due:** Mar 17, 2003
Calibration Location: N/A
Environment: Temp. 74.0°F Hum. 50 %RH
***As Found:** IN TOLERANCE
***As Left:** IN TOLERANCE

This certificate documents traceability to the National Institute of Standards and Technology (NIST) and the International System of Units (SI). The Laboratory quality system conforms to ISO/IEC 17025, 1999 and ANSI/NCSL Z540-1-1994 which are equivalent to relevant requirements of the ISO 9000-1994 series of standards. This certificate may not be reproduced, except in full, without the written approval of the Southwest Research Institute Calibration Laboratory. The results of this calibration relate only to the individual instrument described above. This certificate shall not be used to claim product endorsement by the American Association for Laboratory Accreditation (A2LA) or any agency of the U. S. Government.

Uncertainty evaluation includes the item under test and is calculated in accordance with the ISO "Guide to the Expression of Uncertainty in Measurement" (GUM). The uncertainty represents an expanded uncertainty using a coverage factor of $k=2$ to approximate a 95% confidence level. The calibration process provides a Test Uncertainty Ratio (TUR) of less than or equal to 25% (4:1) of the test limit unless otherwise stated in remarks or an attachment.

*The client has sole responsibility for determination of in/out of tolerance or compliance/noncompliance. An in/out of tolerance opinion is provided for your convenience based only on the Test Instrument (TI) reading(s) and limits as reported. The reported uncertainty relates only to the results at the time of calibration and does not imply any short or long term stability of the TI.

**Calibration interval is determined by the client and does not assure the instrument will remain within tolerance until this date. Any number of factors may cause the instrument to be out of tolerance before the next calibration date.

Remarks: None

Standards Used

| Asset | Manufacturer | Model | Description | Cal Due |
|--------|----------------------|-----------------|--------------|------------|
| 009137 | HART SCIENTIFIC, INC | 1575 | THERMOMETER | Dec 10, 02 |
| 008920 | HART SCIENTIFIC, INC | 17660-A-120-6-W | PLATINUM RTD | Dec 07, 02 |

Approved by: Walt Hill
Metrology Group Leader

Measurements by: Walt Hill
Metrology Technician

Southwest Research Institute
Calibration laboratory
Calibration Sheet.

| | | | | | |
|-------------|-----------|-------|-------------------|------------|--------------------|
| Work Order: | 444050125 | Mfr. | FISHER SCIENTIFIC | Technician | WHILL |
| Asset No. | 008108 | Model | 15-166A | Procedure | CL-9 5/99 |
| Serial No. | A2000-123 | Type. | THERMOMETER | Cal Date. | September 17, 2002 |
| Remarks: | | | | | |

| Function/Range | Standard | TI Reading | Difference | Test Limits+/- | Uncertainty | Found/Left |
|----------------|----------|------------|------------|----------------|-------------|------------|
| | Deg C | Deg C | Deg C | Deg C | Deg C | Results |
| -20 | -19.79 | -20.0 | -0.2 | 1 | 1.2 | Pass |
| 0 | 0.10 | 0.2 | 0.1 | 1 | 1.2 | Pass |
| 50 | 49.99 | 50.1 | 0.1 | 1 | 1.2 | Pass |
| 100 | 99.94 | 100.0 | 0.1 | 1 | 1.2 | Pass |
| 150 | 149.81 | 149.5 | -0.3 | 1 | 1.2 | Pass |



SOUTHWEST RESEARCH INSTITUTE™

6220 Culebra Road, P.O. Drawer 28510
Institute Quality Systems
Institute Calibration Laboratory
Phone: 210-522-5215 Fax 210-522-3692

Certificate of Calibration

Submitted By: DIV20

Address: B57

Contact: DARRELL DUNN

Manufacturer Model: FISHER SCIENTIFIC ASTM 1C-BF

Description: THERMOMETER

Serial No: A2000-123

Asset No: 008108

Procedure: THERMOMETERS, JAN/03

Work Order: 444053021

Date Issued: Mar 27, 2003

Calibration Date: Mar 27, 2003

****Calibration Due:** Sep 27, 2003

Calibration Location: Bldg. 64

Environment: Temp. 80.0°F Hum. 36 %RH

***As Found:** IN TOLERANCE

***As Left:** IN TOLERANCE

This certificate documents traceability to the National Institute of Standards and Technology (NIST) and the International System of Units (SI). The Laboratory quality system conforms to ISO/IEC 17025, 1999 and ANSI/NCSL Z540-1-1994 which are equivalent to relevant requirements of the ISO 9000-1994 series of standards. This certificate may not be reproduced, except in full, without the written approval of the Southwest Research Institute Calibration Laboratory. The results of this calibration relate only to the individual instrument described above. This certificate shall not be used to claim product endorsement by the American Association for Laboratory Accreditation (A2LA) or any agency of the U. S. Government.

Uncertainty evaluation includes the item under test and is calculated in accordance with the ISO "Guide to the Expression of Uncertainty in Measurement" (GUM). The uncertainty represents an expanded uncertainty using a coverage factor of $k=2$ to approximate a 95% confidence level. The calibration process provides a Test Uncertainty Ratio (TUR) of less than or equal to 25% (4:1) of the test limit unless otherwise stated in remarks or an attachment.

*The client has sole responsibility for determination of in/out of tolerance or compliance/noncompliance. An in/out of tolerance opinion is provided for your convenience based only on the Test Instrument (TI) reading(s) and limits as reported. The reported uncertainty relates only to the results at the time of calibration and does not imply any short or long term stability of the TI.

**Calibration interval is determined by the client and does not assure the instrument will remain within tolerance until this date. Any number of factors may cause the instrument to be out of tolerance before the next calibration date.

Remarks: None

Standards Used

| Asset | Manufacturer | Model | Description | Cal Due |
|--------|----------------------|-----------------|--------------|------------|
| 009137 | HART SCIENTIFIC, INC | 1575 | THERMOMETER | Jul 06, 03 |
| 008920 | HART SCIENTIFIC, INC | 17660-A-120-6-W | PLATINUM RTD | Jul 06, 03 |

Approved by: Walt Hill

Metrology Group Leader

m:\Non21a1.rpt Rev date 15, August 02

Measurements by: Mark Romero

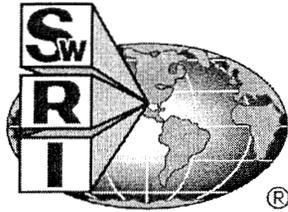
Metrology Technician

Southwest Research Institute
Calibration laboratory
Measurement Record

| | | | | | |
|-------------|-----------|-------|-------------------|------------|----------------|
| Work Order: | 444053021 | Mfr. | Fisher Scientific | Technician | Mark A. Romero |
| Asset No. | 008108 | Model | ASTM 1C-BF | Cal Date. | 27-Mar-03 |
| Serial No. | A2000-123 | Type. | THERMOMETER | | |
| Remarks: | | | | | |

| Function/Range | Test Point | TI Reading | Difference | Test Limits+/- | Uncertainty | Found/Left |
|----------------|------------|------------|------------|----------------|-------------|------------|
| Temperature | Deg C | Deg C | Deg C | Deg C | Deg C | Results |
| -20 | -20.0 | -20.0 | 0.0 | 0.5 | 1.2 | Pass |
| 0 | 0.1 | 0.0 | -0.1 | 0.5 | 1.2 | Pass |
| 50 | 50.0 | 50.0 | 0.0 | 0.5 | 1.2 | Pass |
| 100 | 100.0 | 100.2 | 0.2 | 0.5 | 1.2 | Pass |
| 150 | 150.0 | 150.0 | 0.0 | 0.5 | 1.2 | Pass |

END OF REPORT



CNWRA *A center of excellence in earth
sciences and engineering*

6220 Culebra Road · San Antonio · Texas, U.S.A. 78228-5166

MEMORANDUM

To: SwRI Calibration Lab
From: Darrell S. Dunn *D.S.D.*
Date: August 1, 2003
Subject: Broken Thermometers

The following thermometer was broken in service and needs to be removed from the calibration recall list. A copy of this memorandum will be placed in the Division 20 calibration records for this thermometer.

Fisher Scientific Model 15-166A Serial Number 2000-123 Asset Number 008108

Please contact me at extension 6090 if you have any questions.