

SOUTHWEST RESEARCH INSTITUTE

Department of Quality Assurance

Calibration Laboratory • 522-5215

WORK ORDER

WORK ORDER # 36849 ASSET # 007665 DATE 17 Nov 99

ITEM DATA:

Manufacturer Erco Model ASTM 10
Description Thermometer Serial # 198-191
Accessories _____

ACTION REQUESTED Cal

CUSTODIAN D. J. Dunn

Turned in by: _____ Phone 6090

CHARGE # 20:04 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 WMP Date 11-17-99

Work involves proprietary/confidential information or equipment (Yes) (No)

CONDITION RECEIVED: _____ Out of tolerance
 In tolerance
_____ Damaged (Contact customer)
_____ Contact _____ Date _____
 Received into system, introduced or reactivated

ACTION TAKEN: (Calibration/Repair/Parts) calibrated per procedure

CAL ENVIRONMENT: Temperature 75 °F Humidity 52 %RH

CALIBRATED/REPAIRED:
By [Signature] Cal Procedure CL-9, May 99
Date 22 Nov 99 Accuracy [Signature]
Cal Interval 6 mos Reliability Code 1
Next Cal Due 22 May 00 Cal Time 2 Repair Time _____
Standards used (Asset #) 5243, 5174

DATE COMPLETED 22 Nov 99
DATE PICKED UP 11/23/99 PICKED UP BY [Signature]

36849



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

22 November 1999

Issued to: DARRELL DUNN DIV20 B57
Manufacturer/Model: ERTCO ASTM 1C
Description: THERMOMETER
Serial Number: E98-191
Asset Number: 007665

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.

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: 75.0 Degrees Fahrenheit Humidity: 52 % RH

Calibration Date: 22 Nov 99 **Calibration Procedure:** CL-9, MAY99

Condition as Received: IN TOLERANCE

Condition as Released: IN TOLERANCE

Remarks:

Approved by:



Jim Patterson, Supervisor or Walt Hill, Metrologist

Certificate # 36849

m:\a2la.rpt Rev date 10 Mar 99

Measurements performed by:



Ken Harp, Technician

Page 1 of 1

WORK ORDER 39208

Date Received 5/25/00

Asset No. 007665 Manufacturer ERTCO Model ASTM 1C
Description THERMOMETER Serial Number E98-191
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. 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

PARTS

Part Name	Part Number	Cost	Failure Description

WORK SUMMARY

Failure Description _____
Repair Action _____
Cal Procedure CL-9, 5/99 Temp 76 F Hum 47 %
Tech JW Cal Hrs. 17 Repair Hrs. _____ Part Cost _____
Action Taken ewl
Standards Used 219 5174
Date Cal 1 JUN 2000 Int. 6 Mo. Date Due 1 DEC 2000 Reliability Code _____
Date Picked Up 6/2/00 Picked Up By Darrell Dunn

39208



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

1 June 2000

Issued to: DARRELL DUNN DIV20 B57
Manufacturer/Model: ERTCO ASTM 1C
Description: THERMOMETER
Serial Number: E98-191
Asset Number: 007665

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.

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Ambient Conditions: Temperature: 76.0 Degrees Fahrenheit Humidity: 47 % RH

Calibration Date: 1 Jun 00 **Calibration Procedure:** CL-9, 5/99

Condition as Received: In Tolerance

Remarks:

Approved by:

Jim Patterson, Supervisor, or Walt Hill, Metrologist

Certificate # 39208

m:\a2la.rpt Rev date 22 May 00

Measurements performed by:

Jerry White, Technician

Page 1 of 1

SOUTHWEST RESEARCH INSTITUTE

Calibration Laboratory

WORK ORDER

Processed by RCRUZ at 3:56:28PM on 12/14/00



Work Order 444041749

Arrived 12/14/00

Asset No. 007665 Manufacturer ERTCO

Model ASTM 1C

Instrument Type/Class THERMOMETER

Serial No. E98-191

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 _____

Temp 69 F Hum. 40 %

Tech JW Totals Cal Hours 1 Repair Hours _____ Parts Cost _____

Standards Used 219

Date Picked Up 1/9/2001

Picked Up By [Signature]

444041749



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

22 December 2000

Issued to: DARRELL DUNN DIV20 B57
Manufacturer/Model: ERTCO ASTM 1C
Description: THERMOMETER
Serial Number: E98-191
Asset Number: 007665

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: 69.0 Degrees Fahrenheit Humidity: 40 % RH

Calibration Date: 21 Dec 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 # 444041749

mAa2la.rpt Rev date 22 May 00

Measurements performed by:

Jerry White, Technician

SOUTHWEST RESEARCH INSTITUTE

Calibration Laboratory

WORK ORDER

Processed by RCRUZ at 2:43:41PM on 6/22/01



Work Order 444044161

Arrived 6/22/01

Asset No. 007665 Manufacturer ERTCO

Model ASTM 1C

Instrument Type/Class THERMOMETER

Serial No. E98-191

Accessory No.

Calibration Procedure CL-9, 5/99

Location B57

Div/Client DIV20

Custodian DARRELL DUNN

Mail Stop B57

Tel. 6090

Charge/Project No. 00751.006 1.20

Delivered By / Telephone

IN4CAL

Special Instructions _____

WORK NOTES

Date	Hours	Remarks/Notes
6/25	.5	Calibration
6/26	.5	Calibration

REPAIR PARTS

Date	Hours	Part Name	Part Number	Failure Description	Cost
N/A					

WORK SUMMARY

Failure Description None

Repair Action None

Calibration Procedure CL-9, 5/99 Temp 75F Hum. 50 %

Tech _____ Totals Cal Hours _____ Repair Hours _____ Parts Cost _____

Standards Used _____

Date Picked Up 7/9/01

Picked Up By Bill K...

19166



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

26 June 2001

Issued to: DARRELL DUNN DIV20 B57
Manufacturer/Model: ERTCO ASTM 1C
Description: THERMOMETER
Serial Number: E98-191
Asset Number: 007665
Work Order Number: 444044161

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.

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Ambient Conditions: Temperature: 75.0 Degrees Fahrenheit Humidity: 50 % RH

Calibration Date: 26 Jun 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, 12/6/01 2:25:38PM

Arrived 12/6/01

Work Order **444046368**

Asset No. 007665 Manufacturer ERTCO

Model ASTM 1C

Equipment Type THERMOMETER

Serial No. E98-191

Accessory No.

Interval 6 M

Calibration Procedure CL-9, 5/99

Location B57

Div/Client DIV20

Custodian DARRELL DUNN

Mail Stop B57

Tel 6090

IN4CAL

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.

WORK NOTES

Date	Hours	Remarks/Notes
<u>12/11</u>	<u>1.0</u>	<u>cal</u>

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

WORK SUMMARY

Failure Description n/a

Repair Action n/a

Tech RDKS1 Cal Hrs. 1.0 Repair Hrs _____ Parts Cost _____ Temp 75 F Hum. 36 %

Standards Used 0219

Date Picked Up 12/18/01

Picked Up By Darrell Dunn

444046368



Southwest Research Institute
6220 Culebra Road
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Department of Quality Assurance
Calibration Laboratory

Certificate of Calibration

13 December 2001

Issued to: DARRELL DUNN DIV20 B57
Manufacturer/Model: ERTCO ASTM 1C
Description: THERMOMETER
Serial Number: E98-191
Asset Number: 007665
Work Order Number: 444046368

This certifies the above item was calibrated in compliance with MIL-STD-45662A and ANSI/NC SL 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: 36 % RH

Calibration Date: 11 Dec 01 **Calibration Procedure:** CL-9, 5/99

Condition as Received: SEE ATTACHED DATA

Condition as Returned: SEE ATTACHED DATA

Remarks: SEE ATTACHED DATA SHEET FOR DATA AND UNCERTAINTY.

Approved by:

Walt Hill, Supervisor
Institute Calibration Laboratory

Measurements performed by:

Roger Dykstra, Technician

Southwest Research Institute
Calibration Laboratory
Calibration Data Sheet

Workorder 444048917
Asset #. 007665
Serial #. E98-191

Mfr. Ertco
Model ASTM-1
Type Thermometer

Technician R Dykstra
Procedure CL-9, 5/99
Cal Date 6/10/02

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
9414.00	12/06/02	H.P. 34420A Digital Multi-Meter
005174	12/06/02	RTD probe
009137	12/10/02	Hart Super Thermometer
008920	12/07/02	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)

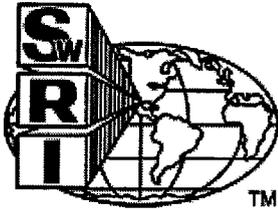
Degree C	Degree C	Degree C	Degree C	Degree C	
	As Found				
Std Reading	TI Reading	Error	Test Limits	Uncertainty	Results
-19.90	-20.0	-0.10	1	0.35	Pass
0.10	0.4	0.30	1	0.35	Pass
49.99	50.0	0.01	1	0.35	Pass
99.95	100.0	0.05	1	0.35	Pass
149.91	149.8	-0.11	1	0.35	Pass

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.



Southwest Research Institute
6220 Culebra Road
San Antonio, TX 78238
(210) 522-5215
Department of Quality Assurance
Calibration Laboratory

Certificate of Calibration

11 June 2002

Issued to: DARRELL DUNN DIV20 B57
Manufacturer/Model: ERTCO ASTM 1C
Description: THERMOMETER
Serial Number: E98-191
Asset Number: 007665
Work Order Number: 444048917

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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: 68.0 Degrees Fahrenheit Humidity: 36 % RH

Calibration Date: 11 Jun 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