

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

WORK ORDER

CERTIFICATE # 23525 ASSET # 004828 DATE 02 Dec 96

ITEM DATA:  
Manufacturer Blue All that Co. Model BM1000  
Description Photo Plotter Recorder Serial # 9E34523  
Accessories \_\_\_\_\_

ACTION REQUESTED \_\_\_\_\_

CUSTODIAN Carol Dunn, Div. 20 Peter Angell

Turned in by: Carol Dunn Phone 6070

CHARGE # 20-9995-001 Date Required \_\_\_\_\_

INSTRUMENT USED ON:  NUCLEAR  DOD  NASA  GLP  SPPE  
 OTHER \_\_\_\_\_

COPY OF CALIBRATION CERTIFICATE  Yes  No

CONDITION RECEIVED: \_\_\_\_\_ Out of tolerance, repaired to specifications  
\_\_\_\_\_ In tolerance, minor adjustments/repairs made  
 In tolerance, no adjustments/repairs  
\_\_\_\_\_ Out of tolerance, adjusted to specifications  
\_\_\_\_\_ Received into system, introduced or reactivated  
\_\_\_\_\_ Calibration internal  
\_\_\_\_\_ Realibility code

ACTION TAKEN: (Calibration/Repair/Parts) Calibrated Per Specimen.

CAL ENVIRONMENT:  
Temperature 50 °F Humidity 26 %RH

CALIBRATED/REPAIRED:  
By [Signature] Cal Procedure [Signature]  
Date 3 Dec 96 Accuracy [Signature]  
Cal Interval 6 Mths Time to complete: \_\_\_\_\_  
Next Cal due 3 Jun 97 Cal 2.5 Repair \_\_\_\_\_  
Standards used (Asset#) 219, 328

DATE COMPLETED 3 Dec 96  
DATE PICKED UP 12/4/96 PICKED UP BY [Signature]

23525

# CALIBRATION CHECK FORM

Date Calibrated 3 Dec 96 Work Order 22525  
 Technician 8216  
 Unit Under Test CIRCULAR CHART READER  
 Manufacturer ONE M ELECT. CO. Model OM7000 SN 91534523 ASN 4828

STEP	FUNCTION OR RANGE	APPLIED	TOLERANCE		MEASURED VALUES		P/F
			MIN	MAX	AS FOUND	RELEASED	
1	SENSOR #1	0.0°C	-1.0	+1.0	0.0		P
		10.0°C	8.97	11.02	10.0		P
		20.0°C	18.95	21.05	20.0		P
		30.0°C	28.92	31.07	30.0		P
		40.0°C	38.9	41.1	40.0		P
		50.0°C	48.9	51.1	50.0		P
	SENSOR #2	0.0°C	-1.0	+1.0	0.0		P
		10.0°C	8.97	11.02	9.44		P
		20.0°C	18.95	21.05	19.44		P
		30.0°C	28.92	31.07	29.44		P
		40.0°C	38.9	41.1	39.44		P
		50.0°C	48.9	51.1	49.44		P

SOUTHWEST RESEARCH INSTITUTE  
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**WORK ORDER**

CERTIFICATE # 25533 ASSET # 004028 DATE 23 May 97

ITEM DATA:  
Manufacturer Blue M. Electric Company Model BM71110000011  
Description Circular chart recorder/multimeter Serial # 91E34523  
Accessories \_\_\_\_\_

ACTION REQUESTED Cal

CUSTODIAN DIV 70, Donnell Gunn Peter Angell

Turned in by: Donnell Gunn Phone 6070

CHARGE # 20-5700-S11 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 \_\_\_\_\_ Date \_\_\_\_\_

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) Collected Per procedure

CAL ENVIRONMENT:  
Temperature 74°F Humidity 49%RH

CALIBRATED/REPAIRED:  
By Rudolph Cal Procedure CCCP-TC-008  
Date 30 May 97 Accuracy 1/2% Spec  
Cal Interval 6 Mos Reliability Code: 3  
Next Cal due 30 Nov 97 Cal Time 2.0 Repair Time \_\_\_\_\_  
Standards used (Asset#) 219, 328

DATE COMPLETED 30 May 97  
DATE PICKED UP 6/4/97 PICKED UP BY [Signature]

**25533**

# CALIBRATION CHECK FORM

Date Calibrated 30 Apr 97 Work Order 23525

Technician 8216

Unit Under Test Circular Chart Recorder

Manufacturer Blue M Electric Model BM7000 SN 91631523 ASN 4828

STEP	FUNCTION OR RANGE	APPLIED	TOLERANCE		MEASURED VALUES		P/F
			MIN	MAX	AS FOUND	RELEASED	
1	Sensor #1	°C	°C				
		0.0	-1.0	+1.0	0		P
		10.0	8.97	11.02	10		P
		20.0	18.95	21.05	20		P
		30.0	28.93	31.07	30		P
		40.0	38.9	41.1	40		P
		50.0	48.9	51.1	50		P
2	Sensor #2	°C	°C				
		0.0	-1.0	+1.0	0		P
		10.0	8.97	11.02	10		P
		20.0	18.95	21.05	20		P
		30.0	28.93	31.07	29		P
		40.0	38.9	41.1	39		P
		50.0	48.9	51.1	49		P

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**WORK ORDER**

CERTIFICATE # 21800 ASSET # 001828 DATE 21 Dec 97

ITEM DATA:

Manufacturer Blue M Machine Model BM 11000011  
Description Hand, stand, Serial # 91834523  
Accessories \_\_\_\_\_

ACTION REQUESTED cal

CUSTODIAN DVDO, Darrell Damm

Turned in by: \_\_\_\_\_ Phone \_\_\_\_\_

CHARGE # 21401-571 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 \_\_\_\_\_ Date \_\_\_\_\_

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) calibrated per procedure

CAL ENVIRONMENT:  
Temperature 76 °F Humidity 26 %RH

CALIBRATED/REPAIRED:  
By J A White Cal Procedure CLCA-TC-008  
Date 16 Dec 97 Accuracy 1/2 g force  
Cal Interval 6 mos Reliability Code: 4  
Next Cal due 16 Jun 98 Cal Time 2 Repair Time \_\_\_\_\_  
Standards used (Asset#) 219, 328

DATE COMPLETED 16 Dec 97  
DATE PICKED UP 12/17/97 PICKED UP BY [Signature]

21800

# CALIBRATION CHECK FORM

Date Calibrated 16 Dec 97 Work Order \_\_\_\_\_  
 Technician 7213 CAL. APPROVAL: SLCP-TC-08  
 Unit Under Test Circular Chart Recorder  
 Manufacturer Blue M Electric Model BM7000 SN 91E91523 ASN 4828

STEP	FUNCTION OR RANGE	APPLIED	TOLERANCE		MEASURED VALUES		P/F
			MIN	MAX	AS FOUND	RELEASED	
1	Sensor #1	°C	°C				
1.1		0.0	-1.0	+1.0	0		P
1.2		10.0	8.97	11.02	10		P
1.3		20.0	18.95	21.05	20		P
1.4		30.0	28.93	31.07	30		P
1.5		40.0	38.9	41.1	40		P
1.6		50.0	48.9	51.1	50		P
2	Sensor #2	°C	°C				
2.1		0.0	-1.0	+1.0	0		P
2.2		10.0	8.97	11.02	10		P
2.3		20.0	18.95	21.05	20		P
2.4		30.0	28.93	31.07	29		P
2.5		40.0	38.9	41.1	39		P
2.6		50.0	48.9	51.1	49		P

*B. J. [Signature]*

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WORK ORDER

CERTIFICATE # 30697 ASSET # 004828 DATE 8/3/98

ITEM DATA:

Manufacturer BLUE M ELECTRIC Model BM1110000011  
Description CHART RECORDER Serial # 91E34523  
Accessories SENSOR

ACTION REQUESTED Cal

CUSTODIAN David Duan

Turned in by: David Phone \_\_\_\_\_

CHARGE # 20-1402-571 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 \_\_\_\_\_ Date 8/3/98

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) \_\_\_\_\_

CAL ENVIRONMENT:  
Temperature 76 °F Humidity 51 %RH

CALIBRATED/REPAIRED:  
By W. Hill Cal Procedure CLCP-TC-008  
Date 7 Aug 98 Accuracy mfr Specs  
Cal Interval 06 mo Reliability Code: 5  
Next Cal due 5 Feb 99 Cal Time 1.0 Repair Time \_\_\_\_\_  
Standards used (Asset#) 219/32B

DATE COMPLETED 7 Aug 98  
DATE PICKED UP 8/2/98 PICKED UP BY [Signature]

30697

## WORK ORDER HISTORY

DATE	START STOP	CAL	REP	REMARKS:
Aug 7 ✓	1245 1255	10		
<b>TOTAL CAL/REPAIR</b>				<b>TOTAL HOURS</b> _____



# CALIBRATION CHECK FORM

Date Calibrated 7 Aug 98 Work Order 30697  
 Technician W. Hill CAL. PROCEDURE: CLCP-TC-08  
 Unit Under Test Circular Chart Recorder  
 Manufacturer Blue M Electric Model BM7000 SN 91E34523 ASN 4828

STEP	FUNCTION OR RANGE	APPLIED	TOLERANCE		MEASURED VALUES		P/F
			MIN	MAX	AS FOUND	RELEASED	
1	Sensor #1	°C	°C				
1.1		0.0	-1.0	+1.0	0		
1.2		10.0	8.97	11.02	9.96		
1.3		20.0	18.95	21.05	20.33		
1.4		30.0	28.93	31.07	30.22		
1.5		40.0	38.9	41.1	40.37		
1.6		50.0	48.9	51.1	49.92		
2	Sensor #2	°C	°C				
2.1		0.0	-1.0	+1.0	0		
2.2		10.0	8.97	11.02	9.96		
2.3		20.0	18.95	21.05	20.33		
2.4		30.0	28.93	31.07	30.53		
2.5		40.0	38.9	41.1	40.37		
2.6		50.0	48.9	51.1	50.66		

*Handwritten signature or initials*

SOUTHWEST RESEARCH INSTITUTE  
Department of Quality Assurance  
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WORK ORDER

CERTIFICATE # 33263 ASSET # 004828 DATE 10 FEB 99

ITEM DATA:

Manufacturer Blue M Electric Model BM-111/2000011  
Description Chart recorder Serial # 91E34523  
Accessories \_\_\_\_\_

ACTION REQUESTED Cal

CUSTODIAN Div. 70, David Dunn

Turned in by: \_\_\_\_\_ Phone 0090

CHARGE # 20. 1402.571 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 MAR Date 02-10-99

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) cal OK

CAL ENVIRONMENT:  
Temperature 71 °F Humidity 45 %RH

CALIBRATED/REPAIRED:  
By MAR Cal Procedure QCP-TC-008  
Date 1 MAR 99 Accuracy ± 1°C  
Cal Interval 6 Reliability Code: \_\_\_\_\_  
Next Cal due 1 Sept 99 Cal Time 2 Repair Time \_\_\_\_\_  
Standards used (Asset#) 219 328

DATE COMPLETED 1 MAR 99  
DATE PICKED UP 3/4/99 PICKED UP BY [Signature]

33263

# WORK ORDER HISTORY

*1 MAN*

DATE	START STOP	CAL	REP	Top	Bottom	REMARKS:
<del>8/2</del>			<del>5</del>			<del>14</del>
<del>8/2</del>		-15	037	-15	-14	-15
		-9	101	0	0	0
		25	054	25	28	25
		49	987	50	50	49
		74	07	75	75	74
		95	041	95	95	95

TOTAL CAL/REPAIR \_\_\_\_\_

TOTAL HOURS \_\_\_\_\_

*Room 27.3  
Red 27 27*

# CALIBRATION CHECK FORM

Date Calibrated \_\_\_\_\_ Work Order \_\_\_\_\_  
 Technician \_\_\_\_\_ CAL. APPROVAL: SLCP-TC-08  
 Unit Under Test Circular Chart Recorder  
 Manufacturer Blue M Electric Model BM7000 SN \_\_\_\_\_ ASN \_\_\_\_\_

STEP	FUNCTION OR RANGE	APPLIED	TOLERANCE		MEASURED VALUES		P/F
			MIN	MAX	AS FOUND	RELEASED	
1	Sensor #1	°C	°C				
1.1		0.0	-1.0	+1.0			
1.2		10.0	8.97	11.02			
1.3		20.0	18.95	21.05			
1.4		30.0	28.93	31.07			
1.5		40.0	38.9	41.1			
1.6		50.0	48.9	51.1			
2	Sensor #2	°C	°C				
2.1		0.0	-1.0	+1.0			
2.2		10.0	8.97	11.02			
2.3		20.0	18.95	21.05			
2.4		30.0	28.93	31.07			
2.5		40.0	38.9	41.1			
2.6		50.0	48.9	51.1			

*Handwritten signature and scribble*

*Handwritten signature*

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

WORK ORDER

CERTIFICATE # 35952 ASSET # 004828 DATE 09 Sept. 99

ITEM DATA:

Manufacturer Alvo M Electric Model B11711100000011  
Description chart recorder Serial # 9E 34523  
Accessories \_\_\_\_\_

ACTION REQUESTED Cal

CUSTODIAN DIV. 20, Danell 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 mael Date 09-09-99

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) Cal

Previous Cert # 53263

2h

SwRI Cal-Lab By: ju  
CAL: 03/01/99 DUE: 09/01/99  
AN: 004828 SN: 91E34523  
| \_\_\_\_\_ | \_\_\_\_\_ | \_\_\_\_\_ | \_\_\_\_\_ | \_\_\_\_\_ | \_\_\_\_\_ |

CAL ENVIRONMENT:

Temperature 78 °F Humidity 45 %RH

CALIBRATED/REPAIRED:

By [Signature] Cal Procedure CI-9-May 99

Date 9-14-99 Accuracy ±1°C

Cal Interval 6mo Reliability Code: \_\_\_\_\_

Next Cal due 3-14-00 Cal Time 2h Repair Time \_\_\_\_\_

Standards used (Asset#) 000219, 000328

DATE COMPLETED 9-14-99

DATE PICKED UP 9/16/99 PICKED UP BY [Signature]

35952

**CALIBRATION CHECK FORM**

Date Calibrated 9-14-99 Work Order 35952  
 Technician [Signature] CAL. PROCEDURE: STEP-FE-08 CC-9 May 98  
 Unit Under Test Circular Chart Recorder  
 Manufacturer Blue M Electric Model BM7000 SN 91E34523 ASN 4828

STEP	FUNCTION OR RANGE	APPLIED	TOLERANCE		MEASURED VALUES		P/F
			MIN	MAX	AS FOUND	RELEASED	
1	Sensor #1 TOP	°C	°C				
1.1		0.0	-1.0	+1.0	0		P
1.2		10.9 10.0	9.9	11.02 11.9	11		P
1.3		21.6 20.0	20.6	21.05 22.6	22		P
1.4		31.6 30.0	30.6	31.07 32.6	31		P
1.5		41.1 40.0	40.1	41.1 42.1	41		P
1.6		51.5 50.0	50.5	51.1 52.5	51		P
2	Sensor #2 Bottom (gram)	°C	°C				
2.1		0 0.0	-1.0	+1.0	0		P
2.2		10.9 10.0	9.9	11.02 11.9	10		P
2.3		21.6 20.0	20.6	21.05 22.6	21		P
2.4		31.6 30.0	30.6	31.07 32.6	31		P
2.5		41.1 40.0	40.1	41.1 42.1	40		P
2.6		51.5 50.0	50.5	51.1 52.5	51		P
			<div style="font-size: 2em; font-family: cursive;">                     Check to 1°                      1/2                 </div>				
			<div style="font-size: 1.5em; font-family: cursive;">                     D.259, Kdg + 1°C                 </div>				

9/14/99

# WORK ORDER 37935

Date Received 2/24/00

Asset No. 004828 Manufacturer BLUE M ELECTRIC CO. Model BM711100000011  
Description CHART RECORDER Serial Number 91E34523  
Accessory Received/Required NONE  
Div/CC ID NONE Accessory to Asset No. N/A Accuracy +/- 1 C  
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.

### WORK HISTORY

Date	Start Time	Stop Time	Notes

SwRI Cal-Lab By: mmw  
CAL: 03/14/99 DUE: 03/14/00  
AN: 004828 SN: 91E34523

### PARTS

Part Name	Part Number	Cost	Failure Description

### WORK SUMMARY

Failure Description \_\_\_\_\_  
Repair Action \_\_\_\_\_  
Cal Procedure CL-9 May 99 Temp 74 F Hum 51 %  
Tech [Signature] Cal Hrs. 2h Repair Hrs. \_\_\_\_\_ Part Cost \_\_\_\_\_  
Action Taken Cal  
Standards Used 219 5174  
Date Cal 3-2-00 Int. 6 Mo. Date Due 9-2-00 Reliability Code \_\_\_\_\_  
Date Picked Up 3/22/2000 Picked Up By [Signature]  
workreq.rpt Rev 30 Jan 00

37935

# CALIBRATION CHECK FORM

Date Calibrated 3-2-00      Work Order 37935      Cal By *[Signature]*

Procedure No./Date CL-9-Mar99      Unit Under Test Chart recorder

Mfg. Blue M      Model BM71      SN 91E34523 AN 4828

STEP	FUNCTION OR RANGE	APPLIED	TOLERANCE		MEASURED VALUES		P/F
			MIN	MAX	AS FOUND	RELEASED	
TOP		0°C	-1	+1	0°C		P
		27.76°C	26.76	28.76	28°C		P
		41.44°C	40.44	42.44	41°C		P
		79.83°C	78.83	80.83	80°C		P
Bottom		0°C	-1	+1	0°C		P
		27.76°C	26.76	28.76	27°C		P
		41.44°C	40.44	42.44	41°C		P
		79.83°C	78.83	80.83	79°C		P





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

2 March 2000

**Issued to:** DARRELL DUNN DIV20 B57  
**Manufacturer/Model:** BLUE M ELECTRIC CO. BM711100000011  
**Description:** CHART RECORDER  
**Serial Number:** 91E34523  
**Asset Number:** 004828

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: 51 % RH

**Calibration Date:** 2 Mar 00 **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 # 37935

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 8:44:40AM on 10/24/00

I4213

1 10000 0000 0000 0000 0000 0000 0000

Work Order No 444041085

Arrived 10/24/00

Asset No. 004828 Manufacturer BLUE M ELECTRIC CO.

Model BM711100000011

Instrument Type/Class CHART RECORDER

Serial No. 91E34523

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>25 OCT 00</u>		<u>Calibrate</u>
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

### REPAIR PARTS

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

### WORK SUMMARY

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

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

Calibration Procedure CL-9 5199 Temp 75 F Hum. 50 %

Tech A. P. ... Totals Cal Hours 1 Repair Hours \_\_\_\_\_ Parts Cost \_\_\_\_\_

Standards Used 219

Date Picked Up 11/6/2000 Picked Up By [Signature]

**41085**

**Southwest Research Institute**  
Calibration Laboratory

<b>Work Order</b> 444041085	<b>Mfr.</b> Blue M	<b>Tech</b> Tplanas
<b>Asset No.</b> 4828	<b>Model</b> BM71110000011	<b>Procedure</b> CL-9 5/99
<b>Serial No.</b> 91E34523	<b>Type</b> Chart Recorder	<b>Cal Date</b> Oct. 25, 00

**Calibration As Found/As Released Data**

Parameter	Standard Reading	UUT As Found	Tolerance	UUT As Released
1. Sensor #1 TEMP	DEGREES C			
	0.0	0	-1.0 to + 1.0	P
	10.0	10	8.97 to 11.02	P
	20.0	20	18.95 to 21.05	P
	30.0	30	28.93 to 31.07	P
	40.0	40	38.9 to 41.1	P
	50.0	50	48.9 to 51.1	P
2. Sensor #2 TEMP	0.0	0	-1.0 to + 1.0	P
	10.0	10	8.97 to 11.02	P
	20.0	20	18.95 to 21.05	P
	30.0	29	28.93 to 31.07	P
	40.0	39	38.9 to 41.1	P
	50.0	49	48.9 to 51.1	P



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

25 October 2000

**Issued to:** DARRELL DUNN DIV20 B57  
**Manufacturer/Model:** BLUE M ELECTRIC CO. BM711100000011  
**Description:** CHART RECORDER  
**Serial Number:** 91E34523  
**Asset Number:** 004828

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: 75.0 Degrees Fahrenheit Humidity: 50 % RH

**Calibration Date:** 25 Oct 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 # 444041085

m\A2LA.rpt Rev date 22 May 00

**Measurements performed by:**

Tony Planas, Technician

# SOUTHWEST RESEARCH INSTITUTE

## Calibration Laboratory

### WORK ORDER

Processed by RCRUZ at 11:41:23AM on 5/9/01

1 10001 0001 0001 0001 0001 0001 0001 0001

**Work Order 444043514**

Arrived 5/9/01

Asset No. 004828

Manufacturer BLUE M ELECTRIC CO.

Model BM711100000011

Instrument Type/Class CHART RECORDER

Serial No. 91E34523

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 20.00751.006

### 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 76 F Hum. 44 %

Tech 8216 Totals Cal Hours 1.5 Repair Hours \_\_\_\_\_ Parts Cost \_\_\_\_\_

Standards Used 219

Date Picked Up 5/18/2001

Picked Up By [Signature]

**43514**

# CALIBRATION CHECK FORM

Date Calibrated 15/04/01 Work Order 74404/3514  
 Technician [Signature] Cal. Procedures: ELCP 72-05 CL-260 CL-9, 4/1/99  
 Unit Under Test Circular Chart Recorder  
 Manufacturer Blue M Electric Model BM7000 SN 91E3K513 ASN 1828

*1°C ± 25% Range*

STEP	FUNCTION OR RANGE	APPLIED	TOLERANCE		MEASURED VALUES		P/F
			MIN	MAX	AS FOUND	RELEASED	
<b>1</b>	<b>Sensor #1</b>	°C	°C				
1.1		0.0	-1.0	+1.0	0°C		P
1.2		10.0	8.97	11.02	10°C		P
1.3		20.0	18.95	21.05	20°C		P
1.4		30.0	28.93	31.07	30°C		P
1.5		40.0	38.9	41.1	40°C		P
1.6		50.0	48.9	51.1	50°C		P
<b>2</b>	<b>Sensor #2</b>	°C	°C				
2.1		0.0	-1.0	+1.0	0°C		P
2.2		10.0	8.97	11.02	9°C		P
2.3		20.0	18.95	21.05	19°C		P
2.4		30.0	28.93	31.07	29°C		P
2.5		40.0	38.9	41.1	39°C		P
2.6		50.0	48.9	51.1	49°C		P

*B. F. 1995*



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

15 May 2001

**Issued to:** DARRELL DUNN DIV20 B57  
**Manufacturer/Model:** BLUE M ELECTRIC CO. BM71110000011  
**Description:** CHART RECORDER  
**Serial Number:** 91E34523  
**Asset Number:** 004828  
**Work Order Number:** 444043514

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: 76.0 Degrees Fahrenheit Humidity: 44 % RH

**Calibration Date:** 15 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:**

Ken Harp, Technician

# SOUTHWEST RESEARCH INSTITUTE

## Calibration Laboratory

### WORK ORDER

Received by JIBARRA, 1/8/02 11:36:03AM

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

Arrived 1/8/02

Work Order **444046662**

Asset No. 004828 Manufacturer BLUE M ELECTRIC CO.

Model BM711100000011

Equipment Type CHART RECORDER

Serial No. 91E34523

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 20.00751.006

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. *Darrell Dunn*

### WORK NOTES

Date	Hours	Remarks/Notes
<u>1/15/02</u>	<u>2.0</u>	<u>Cal</u>
<u>1/16/02</u>	<u>1.5</u>	<u>Cal</u>
<u>1/21/02</u>	<u>2.0</u>	<u>Cal</u>

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

### WORK SUMMARY

Failure Description Pen # 1 OOT  
Repair Action Recalibrated  
Tech R Dykster Cal Hrs. 4.5 Repair Hrs.   Parts Cost   Temp 76 F Hum. 42 %  
Standards Used 000215

Date Picked Up 1/29/02

Picked Up By *Darrell Dunn*



Southwest Research Institute  
 Calibration Laboratory  
 Calibration Data Sheet Z540

<b>Work Order:</b> 444046662	Mfr. Blue M Electric Co.	Technician R Dykstra
<b>Asset No.</b> 004828	Model BM71110000011	Procedure CL-9, 5/99
<b>Serial No.</b> 91E34523	Type. Chart Recorder	Cal Date. 1/16/02

**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 %. The test limits are specified in the Manual.

	Test Point	As Found	Error	Test Limits	Uncertainty	Results
	Degree C	Degree C	Degree C	Degree C	Degree C	
<b>Channel 1</b>	0.00	0.0	0.00	1.33	1.16	Pass
<b>  Display</b>	10.00	10.0	0.00	1.20	1.16	Pass
	20.00	20.0	0.00	1.07	1.16	Pass
	30.00	30.0	0.00	1.07	1.16	Pass
	40.00	40.0	0.00	1.21	1.16	Pass
	50.00	50.0	0.00	1.34	1.16	Pass
<b>Channel 1</b>	0.00	1.0	1.00	1.63	1.16	Pass
<b>  Chart</b>	10.00	11.5	1.50	1.50	1.16	Fail
	20.00	22.0	2.00	1.37	1.16	Fail
	30.00	32.0	2.00	1.37	1.16	Fail
	40.00	42.0	2.00	1.50	1.2	Fail
	50.00	52.0	2.00	1.63	1.16	Fail
<b>Channel 2</b>	0.00	0.0	0.00	1.33	1.16	Pass
<b>  Display</b>	10.00	10.0	0.00	1.20	1.16	Pass
	20.00	20.0	0.00	1.07	1.16	Pass
	30.00	29.0	-1.00	1.07	1.16	Pass
	40.00	39.0	-1.00	1.21	1.2	Pass
	50.00	49.0	-1.00	1.34	1.16	Pass
<b>Channel 2</b>	0.00	1.0	1.00	1.63	1.16	Pass
<b>  Chart</b>	10.00	11.0	1.00	1.50	1.16	Pass
	20.00	21.0	1.00	1.37	1.16	Pass
	30.00	29.0	-1.00	1.37	1.16	Pass
	40.00	41.0	1.00	1.50	1.16	Pass
	50.00	51.0	1.00	1.63	1.16	Pass

Southwest Research Institute  
Calibration Laboratory  
Calibration Data Sheet Z540

<b>Work Order:</b> 444046662	<b>Mfr.</b> Blue M Electric Co.	<b>Technician</b> R Dykstra
<b>Asset No.</b> 004828	<b>Model</b> BM71110000011	<b>Procedure</b> CL-9, 5/99
<b>Serial No.</b> 91E34523	<b>Type.</b> Chart Recorder	<b>Cal Date.</b> 1/16/02

**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 %. The test limits are specified in the Manual.

	<b>Test Point</b>	<b>As Left</b>	<b>Error</b>	<b>Test Limits</b>	<b>Uncertainty</b>	<b>Results</b>
	<b>Degree C</b>	<b>Degree C</b>	<b>Degree C</b>	<b>Degree C</b>	<b>Degree C</b>	
Channel 1	0.00	0.0	0.00	1.33	1.16	Pass
Display	10.00	10.0	0.00	1.20	1.16	Pass
	20.00	20.0	0.00	1.07	1.16	Pass
	30.00	30.0	0.00	1.07	1.16	Pass
	40.00	40.0	0.00	1.21	1.16	Pass
	50.00	50.0	0.00	1.34	1.16	Pass
Channel 1	0.00	0.0	0.00	1.63	1.16	Pass
Chart	10.00	10.0	0.00	1.50	1.16	Pass
	20.00	20.0	0.00	1.37	1.16	Pass
	30.00	30.5	0.50	1.37	1.16	Pass
	40.00	40.0	0.00	1.50	1.2	Pass
	50.00	50.0	0.00	1.63	1.16	Pass
Channel 2	0.00	0.0	0.00	1.33	1.16	Pass
Display	10.00	10.0	0.00	1.20	1.16	Pass
	20.00	20.0	0.00	1.07	1.16	Pass
	30.00	29.0	-1.00	1.07	1.16	Pass
	40.00	39.0	-1.00	1.21	1.2	Pass
	50.00	49.0	-1.00	1.34	1.16	Pass
Channel 2	0.00	0.0	0.00	1.63	1.16	Pass
Chart	10.00	10.0	0.00	1.50	1.16	Pass
	20.00	20.0	0.00	1.37	1.16	Pass
	30.00	30.0	0.00	1.37	1.16	Pass
	39.00	39.0	0.00	1.50	1.16	Pass
	49.00	49.0	0.00	1.63	1.16	Pass

## Chart Uncertainty

Measurement uncertainty Budget for Blue M Electric recorder Model BM7000.

UUT Characteristics

Temperature  
Chart

Performance Specifications

Range: -20 to 100 Degree C  
Resolution: 1.0 Degree C (Chart)  
Tolerance: 1% of chart span (1.3 degree C)  
Plus .01% of span per degree C from 25 degree C

Temperature  
Display

Range: -20 to 100 Degree C  
Resolution: 1.0 Degree C (Display)  
Tolerance: 0.25% of reading + 1.0 degree C  
Plus .01% of span per degree C from 25 degree C

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

- a) Resolution of chart 1.0
- b) Repeatability is not significant.

	Units	Reading	1.30	0.325
	Degree C	0	Accuracy +/-	Resolution
Source of uncertainty	Value +/- Deg C	Distribution	Divisor	Standard Uncertainty C
Standard	0.03	Rectangular	Sqrt 3	0.017
Repeatability	0	Rectangular	Sqrt 3	0.000
Instrument Resolution (UUT)	1	Rectangular	Sqrt 3	0.577
Combined Uncertainty	RSS			0.58
Expanded Uncertainty	K=2			1.16
Test Accuracy Ratio (TAR)	TI Acc. /STD Acc.			
	54.2	to 1		
Test Uncertainty Ratio (TUR)	TI ACC / Muk=2			
	1.4	to 1		

### Chart Uncertainty

Display			1.30	0.195
	Units	Reading	Accuracy +/-	Resolution
	Degree C	10	1.50	1
Source of uncertainty	Value +/- Deg C	Distribution	Divisor	Standard Uncertainty C
Standard	0.03	Rectangular	Sqrt 3	0.017
Repeatability	0	Rectangular	Sqrt 3	0.000
Instrument Resolution (UUT)	1	Rectangular	Sqrt 3	0.577
Combined Uncertainty	RSS			0.58
Expanded Uncertainty	K=2			1.16
	TI Acc. /STD Acc.			
Test Accuracy Ratio (TAR)	49.8	to 1		
	TI ACC / Muk=2			
Test Uncertainty Ratio (TUR)	1.3	to 1		

Display			1.30	0.065
	Units	Reading	Accuracy +/-	Resolution
	Degree C	20	1.37	1
Source of uncertainty	Value +/- Deg C	Distribution	Divisor	Standard Uncertainty C
Standard	0.03	Rectangular	Sqrt 3	0.017
Repeatability	0	Rectangular	Sqrt 3	0.000
Instrument Resolution (UUT)	1	Rectangular	Sqrt 3	0.577
Combined Uncertainty	RSS			0.58
Expanded Uncertainty	K=2			1.16
	TI Acc. /STD Acc.			
Test Accuracy Ratio (TAR)	45.5	to 1		
	TI ACC / Muk=2			
Test Uncertainty Ratio (TUR)	1.2	to 1		

### Chart Uncertainty

Display	1.30		0.065	
	Units	Reading	Accuracy +/-	Resolution
	Degree C	30	1.37	1
Source of uncertainty	Value +/- Deg C	Distribution	Divisor	Standard Uncertainty C
Standard	0.03	Rectangular	Sqrt 3	0.017
Repeatability	0	Rectangular	Sqrt 3	0.000
Instrument Resolution (UUT)	1	Rectangular	Sqrt 3	0.577
Combined Uncertainty	RSS			0.58
Expanded Uncertainty	K=2			1.16
Test Accuracy Ratio (TAR)	TI Acc. /STD Acc.			
	45.5	to 1		
Test Uncertainty Ratio (TUR)	TI ACC / Muk=2			
	1.2	to 1		

Display	1.30		0.195	
	Units	Reading	Accuracy +/-	Resolution
	Degree C	40	1.50	1
Source of uncertainty	Value +/- Deg C	Distribution	Divisor	Standard Uncertainty C
Standard	0.03	Rectangular	Sqrt 3	0.017
Repeatability	0	Rectangular	Sqrt 3	0.000
Instrument Resolution (UUT)	1	Rectangular	Sqrt 3	0.577
Combined Uncertainty	RSS			0.58
Expanded Uncertainty	K=2			1.16
Test Accuracy Ratio (TAR)	TI Acc. /STD Acc.			
	49.8	to 1		
Test Uncertainty Ratio (TUR)	TI ACC / Muk=2			
	1.3	to 1		

### Chart Uncertainty

Display	1.30		0.325	
	Units	Reading	Accuracy +/-	Resolution
	Degree C	50	1.63	1
Source of uncertainty	Value +/- Deg C	Distribution	Divisor	Standard Uncertainty C
Standard	0.03	Rectangular	Sqrt 3	0.017
Repeatability	0	Rectangular	Sqrt 3	0.000
Instrument Resolution (UUT)	1	Rectangular	Sqrt 3	0.577
Combined Uncertainty	RSS			0.58
Expanded Uncertainty	K=2			1.16
	TI Acc. /STD Acc.			
Test Accuracy Ratio (TAR)	54.2	to 1		
	TI ACC / Muk=2			
Test Uncertainty Ratio (TUR)	1.4	to 1		

## Display Uncertainty

Measurement uncertainty Budget for Blue M Electric recorder Model BM7000.

### UUT Characteristics

Temperature  
Chart

### Performance Specifications

Range: -20 to 100 Degree C  
Resolution: 1.0 Degree C (Chart)  
Tolerance: 1% of chart span (1.3 degree C)  
Plus .01% of span per degree C from 25 degree C

Temperature  
Display

Range: -20 to 100 Degree C  
Resolution: 1.0 Degree C (Display)  
Tolerance: 0.25% of reading + 1.0 degree C  
Plus .01% of span per degree C from 25 degree C

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

- a) Resolution of chart 1.0
- b) Repeatability is not significant.

	Units	Reading	1.00	0.325
	Degree C	0	Accuracy +/-	Resolution
Source of uncertainty	Value +/- Deg C	Distribution	Divisor	Standard Uncertainty C
Standard	0.03	Rectangular	Sqrt 3	0.017
Repeatability	0	Rectangular	Sqrt 3	0.000
Instrument Resolution (UUT)	1	Rectangular	Sqrt 3	0.577
Combined Uncertainty	RSS			0.58
Expanded Uncertainty	K=2			1.16
Test Accuracy Ratio (TAR)	TI Acc. /STD Acc.			
	44.2	to 1		
Test Uncertainty Ratio (TUR)	TI ACC / Muk=2			
	1.1	to 1		

Display Uncertainty

Display		1.00		0.195	
	Units	Reading	Accuracy +/-	Resolution	
	Degree C	10	1.20	1	
Source of uncertainty	Value +/- Deg C	Distribution	Divisor	Standard Uncertainty C	
Standard	0.03	Rectangular	Sqrt 3	0.017	
Repeatability	0	Rectangular	Sqrt 3	0.000	
Instrument Resolution (UUT)	1	Rectangular	Sqrt 3	0.577	
Combined Uncertainty	RSS			0.58	
Expanded Uncertainty	K=2			1.16	
Test Accuracy Ratio (TAR)	TI Acc. /STD Acc.				
	39.9	to 1			
Test Uncertainty Ratio (TUR)	TI ACC / Muk=2				
	1.0	to 1			

Display		1.01		0.065	
	Units	Reading	Accuracy +/-	Resolution	
	Degree C	20	1.07	1	
Source of uncertainty	Value +/- Deg C	Distribution	Divisor	Standard Uncertainty C	
Standard	0.03	Rectangular	Sqrt 3	0.017	
Repeatability	0	Rectangular	Sqrt 3	0.000	
Instrument Resolution (UUT)	1	Rectangular	Sqrt 3	0.577	
Combined Uncertainty	RSS			0.58	
Expanded Uncertainty	K=2			1.16	
Test Accuracy Ratio (TAR)	TI Acc. /STD Acc.				
	35.7	to 1			
Test Uncertainty Ratio (TUR)	TI ACC / Muk=2				
	0.9	to 1			



### Display Uncertainty

Display			1.01	0.065
	Units	Reading	Accuracy +/-	Resolution
	Degree C	30	1.07	1
Source of uncertainty	Value +/- Deg C	Distribution	Divisor	Standard Uncertainty C
Standard	0.03	Rectangular	Sqrt 3	0.017
Repeatability	0	Rectangular	Sqrt 3	0.000
Instrument Resolution (UUT)	1	Rectangular	Sqrt 3	0.577
Combined Uncertainty	RSS			0.58
Expanded Uncertainty	K=2			1.16
Test Accuracy Ratio (TAR)	TI Acc. /STD Acc.			
	35.8	to 1		
Test Uncertainty Ratio (TUR)	TI ACC / Muk=2			
	0.9	to 1		

Display			1.01	0.195
	Units	Reading	Accuracy +/-	Resolution
	Degree C	40	1.21	1
Source of uncertainty	Value +/- Deg C	Distribution	Divisor	Standard Uncertainty C
Standard	0.03	Rectangular	Sqrt 3	0.017
Repeatability	0	Rectangular	Sqrt 3	0.000
Instrument Resolution (UUT)	1	Rectangular	Sqrt 3	0.577
Combined Uncertainty	RSS			0.58
Expanded Uncertainty	K=2			1.16
Test Accuracy Ratio (TAR)	TI Acc. /STD Acc.			
	40.2	to 1		
Test Uncertainty Ratio (TUR)	TI ACC / Muk=2			
	1.0	to 1		

Display Uncertainty

Display	Units	Reading	1.01	0.325
	Degree C	50	Accuracy +/-	Resolution
Source of uncertainty	Value +/- Deg C	Distribution	Divisor	Standard Uncertainty C
Standard	0.03	Rectangular	Sqrt 3	0.017
Repeatability	0	Rectangular	Sqrt 3	0.000
Instrument Resolution (UUT)	1	Rectangular	Sqrt 3	0.577
Combined Uncertainty	RSS			0.58
Expanded Uncertainty	K=2			1.16
Test Accuracy Ratio (TAR)	TI Acc. /STD Acc.			
	44.6	to 1		
Test Uncertainty Ratio (TUR)	TI ACC / Muk=2			
	1.2	to 1		



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

## Certificate of Calibration

22 January 2002

**Issued to:** DARRELL DUNN DIV20 B57  
**Manufacturer/Model:** BLUE M ELECTRIC CO. BM71110000011  
**Description:** CHART RECORDER  
**Serial Number:** 91E34523  
**Asset Number:** 004828  
**Work Order Number:** 444046662

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: 76.0 Degrees Fahrenheit Humidity: 40 % RH


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

**Condition as Received:** OUT OF TOLERANCE

**Condition as Returned:** IN TOLERANCE

**Remarks:**

**Approved by:**

  
Walt Hill, Supervisor  
Institute Calibration Laboratory

**Measurements performed by:**

  
Roger Dykstra, Technician