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

WORK ORDER

CERTIFICATE # 24193 ASSET # 00285 DATE 03Feb.97

ITEM DATA:

Manufacturer FOWLER Model 52-008-008

Description 8" CALIPER Serial # 20-8C-1

Accessories CASE

ACTION REQUESTED CAL

CUSTODIAN D. DUNN

Turned in by: D. DUNN Phone

CHARGE # 20-5708-561 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
- typos Calibration internal
- 6 Realibility code

24193

ACTION TAKEN: (Calibration/Repair/Parts)

CAL ENVIRONMENT:
Temperature 70 °F Humidity 30 %RH

CALIBRATED/REPAIRED:
By 8114
Date 2-11-97
Cal Interval 6M
Next Cal due 8-11-97
Standards used (Asset#) 00217

Cal Procedure W1930M507
Accuracy ±.001
Time to complete:
Cal .8 Repair

DATE COMPLETED 2-11-97
DATE PICKED UP 2/17/97 PICKED UP BY

SwRI Form QA-169-2

CALIBRATION CHECK FORM

WI-9-30-MS07
Rev ____ Chg ____
Page ____ of ____

Date Calibrated 2-11-97 Work Order 24193
Technician BILL
Unit Under Test
Manufacturer FOWLER Model 52-068-008 SN 20-86-1 ASN

STEP	FUNCTION OR RANGE		APPLIED	TOLERANCE MIN	TOLERANCE MAX	MEASURED VALUES AS FOUND	MEASURED VALUES RELEASED	P/F
1	1.000	O.D.		.9995	1.0005	1.000		P
2	4.000	O.D.		3.9995	4.0005	4.000		P
3	6.000	O.D.		5.9995	6.0005	6.000		P
4	8.000	O.D.		7.9995	8.0005	8.000		P
5	10.000	O.D.		9.9995	10.0005			
6	12.000	O.D.		11.9995	12.0005			
7	1.000	I.D.		.9995	1.0005	1.000		P
8	4.000	I.D.		3.9995	4.0005	4.000		P
9	6.000	I.D.		5.9995	6.0005	6.000		P
10	8.000	I.D.		7.9995	8.0005	8.000		P
11	10.000	I.D.		9.9995	10.0005			
12	12.000	I.D.		11.9995	12.0005			
13	1.000	DEPTH		.9995	1.0005	1.000		P
14	4.000	DEPTH		3.9995	4.0005	4.000		P
15	6.000	DEPTH		5.9995	6.0005	6.000		P
16	8.000	DEPTH		7.9995	8.0005	8.000		P
17	10.000	DEPTH		9.9995	10.0005			
18	12.000	DEPTH		11.9995	12.0005			

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

WORK ORDER

CERTIFICATE # 26017 ASSET # 002185 DATE 25 Aug 97

ITEM DATA:

Manufacturer Fowler Model 52-008-008

Description 8" dial caliper Serial # 20-80-1

Accessories _____

ACTION REQUESTED W1

CUSTODIAN Dillo, Darrell Dan

Turned in by: _____ Phone 6090

CHARGE # 20-5708-561 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
- X (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

CAL ENVIRONMENT:
Temperature 70 °F Humidity 62 %RH

CALIBRATED/REPAIRED:
By BJH Cal Procedure W1930M508
Date 9-9-97 Accuracy .001
Cal Interval 6M Reliability Code: 7
Next Cal due 3-9-97 Cal Time 8 Repair Time _____
Standards used (Asset#) 002171

DATE COMPLETED _____
DATE PICKED UP 9/30/97 PICKED UP BY _____

SwRI Form QA-174-0

W1930

CALIBRATION CHECK FORM

Date Calibrated 9-9-97 **Work Order** 26577
Technician BLT
Unit Under Test
Manufacturer FOWLER **Model** 520B-008 **SN** 20-BC-1 **ASN** 002185

STEP	FUNCTION OR RANGE	APPLIED	TOLERANCE MIN - MAX	MEASURED VALUES AS FOUND	MEASURED VALUES RELEASED	P/F
1	0.000 OD		.0005 .0005	.000	—	P
2	2.125			2.125	—	P
3	4.100			4.100	—	P
4	6.500			6.500	—	P
5	8.000			8.000	—	P
6	1.000 ID			1.000	—	P
7	2.125			2.125	—	P
8	4.100			4.100	—	P
9	6.500			6.500	—	P
10	8.000			8.000	—	P
11	0.000 Depth			0.000	—	P
12	2.125			2.125	—	P
13	4.100			4.100	—	P
14	6.500			6.500	—	P
15	8.000			8.000	—	P
16	0.000 Depth			0.000	—	P
17	2.125			2.125	—	P
18	4.100			4.100	—	P
19	6.500			6.500	—	P
20	8.000			8.000	—	P

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

WORK ORDER

CERTIFICATE # 28699 ASSET # 002185 DATE 19 Feb 98

ITEM DATA:

Manufacturer Fowler Model 52-008-008

Description 6" dial caliper Serial # 20-881

Accessories case

ACTION REQUESTED Cal MFG # G226829

CUSTODIAN Dev. 20 Darell Dunn

Turned in by: _____ Phone 6090

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 _____

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 69 °F Humidity 45 %RH

CALIBRATED/REPAIRED:

By [signature] Cal Procedure CCP-MS-007

Date 23 Feb 98 Accuracy [signature]

Cal Interval 6 M/S Reliability Code: 8

Next Cal due 23 AUG 98 Cal Time 1.5 Repair Time _____

Standards used (Asset#) 2171, 1741

DATE COMPLETED 23 Feb 98

DATE PICKED UP 2/25/98 PICKED UP BY [signature]

SwRI Form QA-174-0

1808

CALIBRATION CHECK FORM

Date Calibrated 23 FEB 95 **Work Order** 28699
Technician 8216 **CAL. PROCEDURE:** CLCP-145-007
Unit Under Test DIAL CALIPER
Manufacturer FOWLER **Model** 52-008-008 **SN** 22-3C-1 **ASN** 2185

STEP	FUNCTION OR RANGE	APPLIED	TOLERANCE	MEASURED VALUES		P/F
			MIN - MAX	AS FOUND	RELEASED	
	O.D		+/- 0.001			
	25% RANGE	2.000"		2.000"		P
	50% RANGE	4.000"		4.000"		P
	75% RANGE	6.000"		6.000"		P
	100% RANGE	8.000"		8.000"		P
	I.D					
	25% RANGE	2.000"		2.000"		P
	50% RANGE	4.000"		4.000"		P
	75% RANGE	6.000"		6.000"		P
	100% RANGE	8.000"		8.000"		P
	DEPTH					
	25% RANGE	2.000"		2.000"		P
	50% RANGE	4.000"		4.000"		P
	75% RANGE	6.000"		6.000"		P
	100% RANGE	7.500"		7.500"		P
	OFFSET DEPTH					
	25% RANGE	2.000"		2.000"		P
	50% RANGE	4.000"		4.000"		P
	75% RANGE	6.000"		6.000"		P
	100% RANGE	8.000"		8.000"		P

Q:\COMMON\CALLAB\CALCHECK.FRM

2/23/95.

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

WORK ORDER

CERTIFICATE # 31064 ASSET # 002105 DATE 31Aug98

ITEM DATA:

Manufacturer Fowler Model 52-008-008

Description 8" dial caliper Serial # 20.8C-1

Accessories case MFR s/n 4926829

ACTION REQUESTED Cal

CUSTODIAN Dr. Carroll Dunn

Turned in by: _____ Phone 6090

CHARGE # 20-402-571 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 MAE Date 08/31/98

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) Calibrated Per Procedure

CAL ENVIRONMENT:
Temperature 68 °F Humidity 47 %RH

CALIBRATED/REPAIRED:
By [illegible] Cal Procedure CCA-QS-007
Date 3 Sep 98 Accuracy [illegible]
Cal Interval 6 Mos Reliability Code: 9
Next Cal due 3 Mar 99 Cal Time 1.5 Repair Time _____
Standards used (Asset#) 4465

DATE COMPLETED 3 Sep 98
DATE PICKED UP 9/22/98 PICKED UP BY [signature]

SwRI Form QA-174-0

3064

CALIBRATION CHECK FORM

Date Calibrated 3 Sept 98 **Work Order** 91064
Technician 8216 **Cal. Procedure:** CCCP-MS-007
Unit Under Test Digital Caliper Dial Caliper, 8"
Manufacturer Fowler **Model** 52-008-008 **SN** 20-8C-1 **ASN** 2185

STEP	FUNCTION OR RANGE	APPLIED	TOLERANCE		MEASURED VALUES		P/F
			MIN - MAX		AS FOUND	RELEASED	
	O.D.		+/- 0.001"				
	25% Range	2.000"			2.000"		P
	50% Range	4.000"			4.000"		P
	75% Range	6.000"			6.000"		P
	100% Range	8.000"			8.000"		P
	I.D.						
	25% Range	2.000"			2.000"		P
	50% Range	4.000"			4.000"		P
	75% Range	6.000"			6.000"		P
	100% Range	8.000"			8.000"		P
	DEPTH						
	25% Range	2.000"			2.000"		P
	50% Range	4.000"			4.000"		P
	75% Range	6.000"			6.000"		P
	100% Range	8.000"			8.000"		P
	STEP						
	25% Range	2.000"			2.000"		P
	50% Range	4.000"			4.000"		P
	75% Range	6.000"			6.000"		P
	100% Range	8.000"			8.000"		P

9/8/98

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

WORK ORDER

CERTIFICATE # 33570 ASSET # 002185 DATE 05 MARCH 99

ITEM DATA:

Manufacturer Fowler Model, 52-008-008

Description dial caliper Serial # 20-80-1

Accessories case MFG S/N 6926809

ACTION REQUESTED Cal

CUSTODIAN Div.20, Darrell Dunn

Turned in by: Phone 6090

CHARGE # 20-~~4402-571 OH~~ 03/12 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 MMR Date 03-05-99

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

33570

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 69 °F Humidity 42 %RH

CALIBRATED/REPAIRED:

By ~~16 Mar 99~~ Kurt Heyl Cal Procedure CLCP-MS-207, Dec 97

Date 16 Mar 99 Accuracy Mfg Spec

Cal Interval 6 Mos Reliability Code: 10

Next Cal due 16 Sep 99 Cal Time 1.5 Repair Time

Standards used (Asset#) 6465

DATE COMPLETED 16 Mar 99

DATE PICKED UP 3/18/99 PICKED UP BY Darrell Dunn

SwRI Form QA-174-0

CALIBRATION CHECK FORM

Date Calibrated 16 MAR 99 **Work Order** 33570
Technician BJH **CAL. PROCEDURE:** CICA-MS-007, Dec 97
Unit Under Test DIAL CALIPERS, 8"
Manufacturer FOWLER + NSK **Model** 52-008-008 **SN** 20-8C-1 **ASN** 2/85

STEP	FUNCTION OR RANGE	APPLIED	TOLERANCE	MEASURED VALUES		P/F
			MIN - MAX	AS FOUND	RELEASED	
	ZERO		0	0.000"		P
	O.D.		+/- 0.001"			
	25% RANGE	2.000"		2.000"		P
	50% RANGE	4.000"		4.000"		P
	75% RANGE	6.000"		6.000"		P
	100% RANGE	8.000"		8.000"		P
	I.D.					
	25% RANGE	2.000"		2.000"		P
	50% RANGE	4.000"		4.000"		P
	75% RANGE	6.000"		6.000"		P
	100% RANGE	8.000"		8.000"		P
	DEPTH					
	25% RANGE	2.000"		2.000"		P
	50% RANGE	4.000"		4.000"		P
	75% RANGE	6.000"		6.000"		P
	100% RANGE	8.000"		8.000"		P
	OFFSET DEPTH					
	25% RANGE	2.000"		2.000"		P
	50% RANGE	4.000"		3.999"		P
	75% RANGE	6.000"		6.000"		P
	100% RANGE	8.000"		8.000"		P

4/6/99

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

WORK ORDER

CERTIFICATE # 35948 ASSET # 002185 DATE 09 Sept. 99

ITEM DATA:

Manufacturer Fowler Model 52-008-008

Description dial caliper Serial # 20-8C-1

Accessories case

ACTION REQUESTED Cal

CUSTODIAN Div. 20, Darrell Dunn

Turned in by: _____ Phone 6090

CHARGE # 20-OH 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 MAD! 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) calibrated per procedure

CAL ENVIRONMENT:

Temperature 68 °F Humidity 42 %RH

CALIBRATED/REPAIRED:

By [signature] Cal Procedure CC-11 May 99

Date 14 Sept 99 Accuracy Mfg Spec

Cal Interval 6 Mos Reliability Code: 11

Next Cal due March 00 Cal Time 1.5 Repair Time _____

Standards used (Asset#) 7308, 6465

DATE COMPLETED 14 Sept 99

DATE PICKED UP 9/23/99 PICKED UP BY [signature]

SwRI Form QA-174-0

35948

CALIBRATION CHECK FORM

Date Calibrated 12-16-99 Work Order 35945
Technician 8216 Calibration Procedure: CL-11, May99
Unit Under Test DIAL CALIPERS, 5"
Manufacturer Fowler Model 52-008-08 SN 08-8e-1 ASN 485

STEP	FUNCTION OR RANGE	APPLIED	TOLERANCE	MEASURED VALUES		P/F
			MIN - MAX	AS FOUND	RELEASED	
4.3.2	SEPARATION OF JAWS (CLOSED)					
	Visible Light	NA		YES		
4.3.3	JAW PARALLELISM					
	(Nearest point to TI beam)	NA		0.250"		P
	(Opposite end of Jaws)	NA	< +/- 1 div difference	0.250"		P
4.3.5	OUTSIDE SCALE CALIBRATION		+/- 0.001"			
	25% Range	2.000"	"	2.000"		P
	50% Range	4.000"	"	4.000"		P
	75% Range	6.000"	"	6.000"		P
	100% Range	8.000"	"	8.000"		P
4.4.8	INSIDE SCALE CALIBRATION		+/- 0.001"			
		0.5000"	"	0.499"		P
	50% Range	4.000"	"	3.999"		P
4.4.11	DEPTH SCALE CALIBRATION		+/- 0.001"			
		1.0000"	"	0.999"		P
---	STEP SCALE CALIBRATION		+/- 0.001"			
		1.0000"	"	0.999"		P

WORK ORDER 38598

Date Received 4/10/00

Asset No. 002185 **Manufacturer** FOWLER & NSK **Model** 52-008-008
Description DIAL CALIPER **Serial Number** 20-8C-1
Accessory Received/Required CASE
Div/CC ID NONE **Accessory to Asset No.** N/A **Accuracy** +/-0.001"
Div/CC DIV20 **Location** B57 **Custodian** DARRELL DUNN **Tel.** 6090
Charge/Project No. 20.00751.006 **Proprietary/Confidental** 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

38598

WORK SUMMARY

Failure Description _____

Repair Action _____

Cal Procedure CL-~~15~~ 11, 5/99 **Temp** 68 F **Hum** 44 %

Tech 82/F **Cal Hrs.** 1.5 **Repair Hrs.** _____ **Part Cost** _____

Action Taken Calibrated per procedure

Standards Used 7705, 6465

Date Cal 10Apr00 **Int.** 6 **Mo. Date Due** 10Oct00 **Reliability Code** 12

Date Picked Up 5/2/00 **Picked Up By** [signature]

workreq.rpt Rev 30 Jan 00

CALIBRATION CHECK FORM

Date Calibrated 19 Apr 00 **Work Order** 38598
Technician SZK **Calibration Procedure: CL-11, May99**
Unit Under Test DIAL CALIPERS, 8"
Manufacturer Fowler + NSK **Model** 52-008-008 **SN** 20-8C-1 **ASN** 2185

STEP	FUNCTION OR RANGE	APPLIED	TOLERANCE	MEASURED VALUES		P/F
			MIN - MAX	AS FOUND	RELEASED	
4.3.2	SEPARATION OF JAWS (CLOSED)					
	Visible Light	NA		None		P
4.3.3	JAW PARALLELISM					
	(Nearest point to TI beam)	NA				
	(Opposite end of Jaws)	NA	< +/- 1 div difference			
4.3.5	OUTSIDE SCALE CALIBRATION		+/- 0.001"			
	25% Range	2.000"	"	2.000"		P
	50% Range	4.000"	"	4.000"		P
	75% Range	6.000"	"	6.000"		P
	100% Range	8.000"	"	8.000"		P
4.4.8	INSIDE SCALE CALIBRATION		+/- 0.001"			
		0.5000"	"	0.500"		P
	50% Range	4.000"	"	4.000"		P
4.4.11	DEPTH SCALE CALIBRATION		+/- 0.001"			
		1.0000"	"	1.000"		P
---	STEP SCALE CALIBRATION		+/- 0.001"			
		1.0000"	"	1.000"		P

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

19 April 2000

Issued to: DARRELL DUNN DIV20 B57
Manufacturer/Model: FOWLER & NSK 52-008-008
Description: DIAL CALIPER
Serial Number: 20-8C-1
Asset Number: 002185

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: 68.0 Degrees Fahrenheit Humidity: 44 %RH

Calibration Date: 19 Apr 00 **Calibration Procedure:** CL-11, MAY 99

Condition as Received: IN TOLERANCE

Condition as Released: IN TOLERANCE

Remarks:

Approved by:
Jim Patterson, Supervisor, or Walt Hill, Metrologist

Measurements performed by:
Ken Harp, Technician

Certificate # 38598

m:\a2la.rpt Rev date 14 Dec 99

SOUTHWEST RESEARCH INSTITUTE

Calibration Laboratory

WORK ORDER

Processed by RCRUZ at 8:44:40AM on 10/24/00 I4213

Work Order No 444041096 Arrived 10/24/00

Asset No. 002185 Manufacturer FOWLER & NSK Model 52-008-008

Instrument Type/Class DIAL CALIPER Serial No. 20-8C-1

Accessory No. Calibration Procedure CL-11, MAY 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

REPAIR PARTS

Date	Hours	Part Name	Part Number	Failure Description	Cost

41096

WORK SUMMARY

Failure Description _____

Repair Action _____

Calibration Procedure CL-11, May 99 Temp 68 F Hum. 44 %

Tech 8216 Totals Cal Hours 1 Repair Hours _____ Parts Cost _____

Standards Used 6465

Date Picked Up 11/6/2000 Picked Up By Darrell Dunn

CALIBRATION CHECK FORM

Date Calibrated 2 Nov 00 **Work Order** 444041096
Technician BJG **Calibration Procedure:** CL-11, May99
Unit Under Test DIAL CALIPERS, 8"
Manufacturer Fowler + NSK **Model** 52-008-20 8 **SN** 20-8C-1 **ASN** 2185

STEP	FUNCTION OR RANGE	APPLIED	TOLERANCE	MEASURED VALUES		P/F
			MIN - MAX	AS FOUND	RELEASED	
4.3.2	SEPARATION OF JAWS (CLOSED)					
	Visible Light	NA		NONE		P
4.3.3	JAW PARALLELISM					
	(Nearest point to TI beam)	NA		/		
	(Opposite end of Jaws)	NA	< +/- 1 div difference	/		
4.3.5	OUTSIDE SCALE CALIBRATION		+/- 0.001"			
	25% Range	2.000"	"	2.000"		P
	50% Range	4.000"	"	4.000"		P
	75% Range	6.000"	"	6.000"		P
	100% Range	8.000"	"	8.000"		P
4.4.8	INSIDE SCALE CALIBRATION		+/- 0.001"			
		0.5000"	"	0.499"		
	50% Range	4.000"	"	4.000"		
						*
4.4.11	DEPTH SCALE CALIBRATION		+/- 0.001"			
		1.0000"	"	0.999"		P
---	STEP SCALE CALIBRATION		+/- 0.001"			
		1.0000"	"	0.999"		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 November 2000

Issued to:	DARRELL DUNN DIV20 B57
Manufacturer/Model:	FOWLER & NSK 52-008-008
Description:	CALIPER
Serial Number:	20-8C-1
Asset Number:	002185

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: 68.0 Degrees Fahrenheit Humidity: 44 % RH

Calibration Date: 2 Nov 00 **Calibration Procedure:** CL-11, MAY 99

Condition as Received: IN TOLERANCE

Condition as Released: IN TOLERANCE

Remarks:

Approved by:

Jim Patterson, Supervisor, or Walt Hill, Metrologist

Measurements performed by:

Ken Harp, Technician

Certificate # 444041096

m:\a2la.rpt Rev date 22 May 00

SOUTHWEST RESEARCH INSTITUTE

Calibration Laboratory

WORK ORDER

Processed by RCRUZ at 2:38:38PM on 4/26/01

Work Order 444043358 Arrived 4/26/01

Asset No. 002185 Manufacturer FOWLER & NSK Model 52-008-008

Instrument Type/Class CALIPER Serial No. 20-8C-1

Accessory No. Calibration Procedure CL-11, MAY 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 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-11, May 99 Temp 68 F Hum. 42 %

Tech 8216 Totals Cal Hours 1 Repair Hours _____ Parts Cost _____

Standards Used 6465, 7705

Date Picked Up 5/2/01 Picked Up By

CALIBRATION CHECK FORM

Date Calibrated 30 Aug 01 **Work Order** 44404335-8
Technician 8216 **Calibration Procedure:** CL-11, May99
Unit Under Test DIAL CALIPERS, 8"
Manufacturer FOWLER + NSK **Model** 52-008-208 **SN** 20-8C-1 **ASN** 2185

STEP	FUNCTION OR RANGE	APPLIED	TOLERANCE	MEASURED VALUES		P/F
			MIN - MAX	AS FOUND	RELEASED	
4.3.2	SEPARATION OF JAWS (CLOSED)					
	Visible Light	NA		None		P
4.3.3	JAW PARALLELISM					
	(Nearest point to TI beam)	NA		/		
	(Opposite end of Jaws)	NA	< +/- 1 div difference	/		
4.3.5	OUTSIDE SCALE CALIBRATION		+/- 0.001"			
	25% Range	2.000"	"	2.000"		P
	50% Range	4.000"	"	4.000"		P
	75% Range	6.000"	"	6.000"		P
	100% Range	8.000"	"	8.000"		P
4.4.8	INSIDE SCALE CALIBRATION		+/- 0.001"			
		0.5000"	"	0.499"		P
	50% Range	4.000"	"	3.999"		P
4.4.11	DEPTH SCALE CALIBRATION		+/- 0.001"			
		1.0000"	"	1.000"		P
---	STEP SCALE CALIBRATION		+/- 0.001"			
		1.0000"	"	1.000"		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

30 April 2001

Issued to: DARRELL DUNN DIV20 B57
Manufacturer/Model: FOWLER & NSK 52-008-008
Description: CALIPER
Serial Number: 20-8C-1
Asset Number: 002185
Work Order Number: 444043358

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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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: 42 % RH

Calibration Date: 30 Apr 01 **Calibration Procedure:** CL-11, MAY 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 RCRUZ,12/6/01 2:25:38PM

Arrived 12/6/01 Work Order **444046374**

Asset No. 002185 Manufacturer FOWLER & NSK Model 52-008-008

Equipment Type CALIPER Serial No. 20-8C-1 Accessory No.

Interval 6 M Calibration Procedure CL-11, MAY 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 Type

Charge/Project No. 00751.006 1.20 Requester / Telephone

This information is correct for the work requested.

WORK NOTES

Date	Hours	Remarks/Notes

Date	Hours	Part Name	Part Number	Failure Description	Cost

WORK SUMMARY

Failure Description

Repair Action

Tech 8216 Cal Hrs. 1 Repair Hrs Parts Cost Temp 68 F Hum. 33 %

Standards Used 6465

Date Picked Up 1/7/2002 Picked Up By

CALIBRATION CHECK FORM

Date Calibrated 31 Dec 01 **Work Order** 4440463744
Technician 8216 **Calibration Procedure:** CL-11, May99
Unit Under Test DIAL CALIPERS, 8"
Manufacturer Fowler & NSK **Model** 52-008-008 **SN** 20-8C-1 **ASN** 2185

STEP	FUNCTION OR RANGE	APPLIED	TOLERANCE	MEASURED VALUES		P/F
			MIN - MAX	AS FOUND	RELEASED	
4.3.2	SEPARATION OF JAWS (CLOSED)					
	Visible Light	NA		None		P
4.3.3	JAW PARALLELISM					
	(Nearest point to TI beam)	NA		/		
	(Opposite end of Jaws)	NA	< +/- 1 div difference	/		
4.3.5	OUTSIDE SCALE CALIBRATION		+/- 0.001"			
	25% Range	2.0000"	"	2.0002"		P
	50% Range	4.0000"	"	4.0005"		P
	75% Range	6.0000"	"	6.0000"		P
	100% Range	8.0000"	"	8.0005"		P
4.4.8	INSIDE SCALE CALIBRATION		+/- 0.001"			
		0.5000"	"	0.4995"		P
	50% Range	4.0000"	"	3.9993"		P
4.4.11	DEPTH SCALE CALIBRATION		+/- 0.001"			
		1.0000"	"	1.0000"		P
---	STEP SCALE CALIBRATION		+/- 0.001"			
		1.0000"	"	0.9995"		P

SOUTHWEST RESEARCH INSTITUTE
CALIBRATION LABORATORY

Calibration Data Sheet

Work Order	444046374	Mfr	Fowler & NSK	Tech:	8216
Asset No.	2185	Model	52-008-008	Procedure: CL-11, May99	
Serial No.	20-8C-1	Type	Caliper, 8 in.	Cal Date	31-Dec-01
Remarks:					

Parameter: Length

Caliper Uncertainty Budget

Caliper(TI)	Units	Range	Acc. +/-(m in.)	Resolution(min.)
	in.	12	1	1
Source of Uncertainty	**min.**	**Distribution**	**Divisor**	**Std. Uncert.(min.)**
Gage Block	0.004	Rectangular	sqrt3	0.00231
Repeatability (10 rdg.)	0.09	Normal	1	0.0900
Resolution TI	1	Rectangular	2Sqrt 3	0.289
Combined Uncertainty			RSS	0.30
Expanded Uncertainty			k=2	0.61

Test Accuracy Ratio (TAR)	TI Acc./STD Acc.	
	250	to 1
Test Uncertainty Ratio (TUR)	TI Acc./Muk=2	
	1.7	to 1

Notes: Repeatability based on standard deviation of 10 readings divided by sqrt of 10.

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Department of Quality Assurance
Calibration Laboratory

Certificate of Calibration

31 December 2001

Issued to:	DARRELL DUNN DIV20 B57
Manufacturer/Model:	FOWLER & NSK 52-008-008
Description:	CALIPER
Serial Number:	20-8C-1
Asset Number:	002185
Work Order Number:	444046374

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: 68.0 Degrees Fahrenheit Humidity: 33 % RH

Calibration Date: 31 Dec 01 **Calibration Procedure:** CL-11, MAY 99

Condition as Received: IN TOLERANCE

Condition as Returned: 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 RCRUZ,6/14/02 9:00:15AM

Arrived 6/14/02 Work Order **444049039**

Asset No. 002185 Manufacturer FOWLER & NSK Model 52-008-008

Equipment Type CALIPER Serial No. 20-8C-1 Accessory No.

Interval 6 M Calibration Procedure CL-11, MAY 99 Location B57

Div/Client DIV20 Custodian DARRELL DUNN Mail Stop B57 Tel 6090

IN LINE 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

This information is correct for the work requested.

WORK NOTES

Date	Hours	Remarks/Notes
6/14/02	2.0	CL, Limited calibration

Date	Hours	Part Name	Part Number	Failure Description	Cost

444039

WORK SUMMARY

Failure Description n/a Inside function does not meet tolerance.

Repair Action n/a

Tech RDyke Cal Hrs. 2.0 Repair Hrs ___ Parts Cost ___ Temp 68 F Hum. 35 %

Standards Used CAL5

Date Picked Up 6/20/02 Picked Up By

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

Certificate of Calibration

17 June 2002

Issued to:	DARRELL DUNN DIV20 B57
Manufacturer/Model:	FOWLER & NSK 52-008-008
Description:	CALIPER
Serial Number:	20-8C-1
Asset Number:	002185
Work Order Number:	444049039

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: 68.0 Degrees Fahrenheit Humidity: 36 % RH

Calibration Date: 17 Jun 02 **Calibration Procedure:** CL-11, MAY 99

Condition as Received: OUT OF TOLERANCE

Condition as Returned: LIMITED CALIBRATION

Remarks: LIMITED CALIBRATION, THE INSIDE FUNCTION OF CALIPER DOES NOT MEET TOLERANCE AND SHOULD NOT BE USED.

Approved by:

Walt Hill, Metrology Group Leader
Institute Calibration Laboratory

Measurements performed by:

Roger Dykstra, Technician

Southwest Research Institute
Calibration Laboratory
Calibration Data sheet.

As left data

Work Order	444049039	**Mfr**	Fowler & NSK	**Tech:**	R Dykstra
Asset No.	002185	**Model**	52-008-008	**Procedure:**	**CL-11, May99**
Serial No.	20-8C-1	**Type**	Dial Caliper	**Cal Date:**	6/14/02

Remarks:
The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor (k=2) providing a level of confidence of approximately 95%.
The Difference is equal to TI reading - Std reading.
The results can be Pass. Fail, or if blank "not determinable". If "not determinable" it is up to the end user to determine if results meet their needs. Limited calibration Do Not use the inside function, does not meet tolerance. The accuracy of the 0.001 Inch is in the procedure.

Parameter: Length

	Applied Value(in.)	Indicated Value(in.)	Diff. (in.)	TI Tolerance(in.)	Uncertainty (in)	Results
SEPARATION OF JAWS (CLOSED)						
Visible Light	**NA**	No				
JAW PARALLELISM						
(Nearest point to TI beam)	**NA**					
(Opposite end of Jaws)	**NA**		**0.000000**	**-1 Minor Div.**		
OUTSIDE SCALE CALIBRATION						
	2.0000	2.0000	**0.0000**	0.001	0.00058	Pass
	4.0000	4.0000	**0.0000**	0.001	0.00058	Pass
	6.0000	6.0002	**0.0002**	0.001	0.00058	Pass
	8.0000	8.0002	**0.0002**	0.001	0.00058	Pass
INSIDE SCALE CALIBRATION						
	0.5000	0.4990	**-0.0010**	0.001	0.0006	
	4.0000	3.9980	**-0.0020**	0.001	0.0003	Fail
DEPTH SCALE CALIBRATION						
	1.0000	0.9996	**-0.0004**	0.001	0.00029	Pass
STEP SCALE CALIBRATION						
	1.0000	0.9996	**-0.0004**	0.001	0.00029	Pass

Southwest Research Institute
Calibration Laboratory
Calibration Data sheet.

As found data

Work Order	444049039	**Mfr**	Fowler & NSK	**Tech:**	R Dykstra
Asset No.	002185	**Model**	52-008-008	**Procedure:**	**CL-11, May99**
Serial No.	20-8C-1	**Type**	Dial Caliper	**Cal Date:**	6/14/02

Remarks:
The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor (k=2) providing a level of confidence of approximately 95%.
The Difference is equal to TI reading - Std reading.
The results can be Pass. Fail, or if blank "not determinable". If "not determinable" it is up to the end user to determine if results meet their needs.
The accuracy of the 0.001 Inch is in manual.

Parameter: Length

	Applied Value(in.)	Indicated Value(in.)	Diff. (in.)	TI Tolerance(in.)	Uncertainty (in)	Results
SEPARATION OF JAWS (CLOSED)						
Visible Light	**NA**	No				
JAW PARALLELISM						
(Nearest point to TI beam)	**NA**					
(Opposite end of Jaws)	**NA**		**0.000000**	**-1 Minor Div.**		
OUTSIDE SCALE CALIBRATION						
	2.0000	2.0000	**0.0000**	0.001	0.00058	Pass
	4.0000	4.0000	**0.0000**	0.001	0.00058	Pass
	6.0000	6.0002	**0.0002**	0.001	0.00058	Pass
	8.0000	8.0002	**0.0002**	0.001	0.00058	Pass
INSIDE SCALE CALIBRATION						
	0.5000	0.4990	**-0.0010**	0.001	0.0006	
	4.0000	3.9980	**-0.0020**	0.001	0.0003	Fail
DEPTH SCALE CALIBRATION						
	1.0000	0.9996	**-0.0004**	0.001	0.00029	Pass
STEP SCALE CALIBRATION						
	1.0000	0.9996	**-0.0004**	0.001	0.00029	Pass