

S O U T H W E S T   R E S E A R C H   I N S T I T U T E

Department of Quality Assurance  
Calibration Laboratory

CERTIFICATE OF CALIBRATION

Issued to: DIV20 B57 NARASI SRIDHAR

Device No: 2416

Manufacturer: MOORE

Model: 100 PSI

Nomenclature: PRESSURE GAUGE

Serial Number: 1593006

SwRI No: NONE

Cal interval 12 Mo.

Remarks

Accuracy: MFGR

Procedure: MFGR

ENVIRONMENT

Temperature: 0    Humidity: 0    Location: SWRI BLDG 145

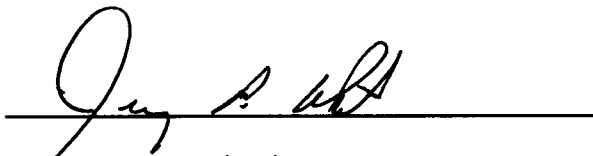
CONCLUSION

Tolerance/Remarks: Received into the system, introduced or reactivated

Standard Reading:	Unit Under Test:
20 psi	20- psi
40 psi	40+ psi
60 psi	60 psi
80 psi	80+ psi
100 psi	101 psi

Calibration was in accord with requirements of MIL-STD-45662A. Measurements are traceable to the National Institute of Standards and Technology. Inspection and test data are on file and available for inspection.

Signed



Calibration Date: 06/09/93

Cal interval: 12 Months

Record Number: 00011498

Next Calibration Due: 06/09/94

S O U T H W E S T   R E S E A R C H   I N S T I T U T E

Department of Quality Assurance  
Calibration Laboratory

Device Serial No: 1593006

Calibration Date: 06/09/93

STANDARDS

Standard No: 1554    Manufacturer: AMETEK

Model: RK-300

Nomenclature: DEADWEIGHT TESTER

Serial No: 82167

Cal.Due: 03/26/94

Cal.Rec.No: 00010846

S O U T H W E S T   R E S E A R C H   I N S T I T U T E

Department of Quality Assurance  
Calibration Laboratory

CERTIFICATE OF CALIBRATION

Issued to: DIV20 B57 RON GREEN

Device No: 2416

Manufacturer: MOORE

Model: 100 PSI

Nomenclature: PRESSURE GAUGE

Serial Number: 1593006

SwRI No: NONE

Cal interval 12 Mo.

Remarks

Accuracy: MFGR

Procedure: MFGR

ENVIRONMENT

Temperature:

Humidity:

Location: SWRI DIV04 BLDG. 145

CONCLUSION

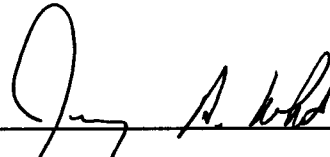
Tolerance/Remarks: Received in tolerance, no adjustments made

Room Temperature.

Standard Reading:	Unit Under Test:
100 psi	100.5 psi
80 psi	80.2 psi
60 psi	60.5 psi
40 psi	40.1 psi
20 psi	20.0 psi

Calibration was in accord with requirements of MIL-STD-45662A. Measurements are traceable to the National Institute of Standards and Technology. Inspection and test data are on file and available for inspection.

Signed



Calibration Date: 06/16/94

Cal interval: 12 Months

Record Number: 00014380

Next Calibration Due: 06/16/95

S O U T H W E S T   R E S E A R C H   I N S T I T U T E

Department of Quality Assurance  
Calibration Laboratory

Device Serial No: 1593006

Calibration Date: 06/16/94

STANDARDS  
-----

Standard No: 1554    Manufacturer: AMETEK

Model: RK-300

Nomenclature: DEADWEIGHT TESTER

Serial No: 82167

Cal.Due: 02/18/95

Cal.Rec.No: 00013739

**SOUTHWEST RESEARCH INSTITUTE**

**Department of Quality Assurance  
Calibration Laboratory**

**CERTIFICATE OF CALIBRATION  
06/21/95**

Issued to: **RON GREEN**                    **DIV20**                    **,B57**  
Manufacturer: **MOORE**  
Nomenclature: **PRESSURE GAUGE**  
Serial Number: **1593006**  
Notes:

Asset Number: **002416**  
Model Number: **100 PSI**  
  
SwRI/Div. I.D. #: **NONE**

**ENVIRONMENTAL CONDITIONS**

Temperature: **65.0F**

Relative Humidity: **65%**

**CALIBRATION INFORMATION**

Procedure Number: **MGFR**  
Remarks:                    **ERROR LESS THAN +/-0.5PSI**

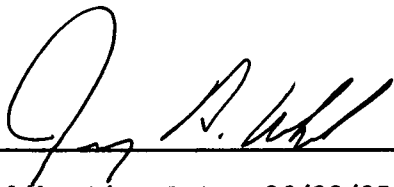
Accuracy:    **MGFR SPECS**  
Received IN    **Tolerance**

**Calibration was in accordance with requirements of MIL-STD-45662A.  
Measurements are traceable to the National Institute of Standards and Tech-  
nology. Inspection and test data are on file and available for inspection.**

**STANDARDS USED FOR CERTIFICATION**

Asset #	Serial #	Mfg	Model #	Nomenclature	Cal Date	Int.	Cal Due
001554	82167	AMETE	RK-300	DEADWEIGHT TESTER	03/02/95	12	03/02/96

Certified by :



Certificate#: **17781**

Calibration Date: **06/20/95**  
Interval: **12 months**  
Next Calibration Due: **06/20/96**

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

WORK ORDER

CERTIFICATE # 32678 ASSET # 002416 DATE 30 Dec 98

ITEM DATA:

Manufacturer Morre Model 0-100psi  
Description pressure gauge Serial # 1593006  
Accessories \_\_\_\_\_

ACTION REQUESTED cal

CUSTODIAN Div. 20, Dan Green

Turned in by: \_\_\_\_\_ Phone 5305

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 MAD Date 12/31/98

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 specification  
\_\_\_\_\_ (S) Received into system, introduced or react

ACTION TAKEN: (Calibration/Repair/Parts) 5 Point Cal

SWRI CALIBRATION LAB  
(210) 522-5215  
CAL ZASTAN 95 BY [Signature]  
DUE DATE 12/31/98 ID 3976  
SN 757 3006

CAL ENVIRONMENT:  
Temperature 68°F Humidity 36 %RH

CALIBRATED/REPAIRED:  
By [Signature] Cal Procedure CLCP-P1-001  
Date 1-6-99 Accuracy Grade A (1% - 2%)  
Cal Interval 12 mo Reliability Code: \_\_\_\_\_  
Next Cal due 1-6-00 Cal Time 1.5 Repair Time \_\_\_\_\_  
Standards used (Asset#) 4163

DATE COMPLETED 1-6-99  
DATE PICKED UP 1/11/99 PICKED UP BY Melissa E Hill

# PRESSURE CALIBRATION CHECK FORM

Date 1-6-99 Work Order 32678 Technician AM Wood  
 Inst Cust. Ron Green Ext 5305 Charge # 20-0751-006 time 1.5 h

A) Unit Under Test Moore Press Gage  
 Model \_\_\_\_\_ Serial No. 1593006 Asset No. 2416  
 Range 100 psi Uncertainty Grade A (1% - 2%) Std Unc \_\_\_\_\_

B) Calibration Standard (1) Mensor  
 Model 5014 Serial No. 340119A Asset No. 4163  
 Uncertainty ± 0.03 psi Std Unc \_\_\_\_\_

C) Calibration Standard (2) N/A  
 Model \_\_\_\_\_ Serial No. \_\_\_\_\_ Asset No. \_\_\_\_\_  
 Uncertainty \_\_\_\_\_ Std Unc \_\_\_\_\_  
 Comb Unc (rss B&C) 0.03 TUR (A Unc/Comb Unc) 33/1

If less than 4:1, Total combined calibration Unc (kXrss) \_\_\_\_\_  
 k = \_\_\_\_\_ Explanation \_\_\_\_\_  
 Env: Room Temp. 68°F Humidity 36% Baro Press. 29.21" Hg  
 Conversion Factor(s) N/A

STANDARD	INCREASING UNITS: PSI	DECREASING UNITS: PSI	TOLERANCE: ± 1/2	
			MIN	MAX
AS FOUND				
20	20.0	20.0	18	22
40	40.3	40.3	39	41
60	60.3	60.4	59	61
80	80.3	80.3	78	82
100	100.3	↑	98	102
AS DELIVERED	<del>In Tol</del>			



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

7 January 1999

**Issued to:** RON GREEN DIV20 B57  
**Manufacturer/Model:** MOORE PRODUCTS 0-100 PSI  
**Description:** PRESSURE GAUGE  
**Serial Number:** 1593006  
**Asset Number:** 002416

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: 68. Degrees Fahrenheit Humidity: 36 % RH

**Calibration Date:** 6 Jan 99 **Calibration Procedure:** CLCP-PI-001 1997

**Condition as Received:** IN TOLERANCE

**Condition as Released:** IN TOLERANCE

**Remarks:**

Mack Wood / Technician



WORK ORDER 39531

Date Received 6/21/00

Asset No. 002416 Manufacturer MOORE PRODUCTS

Model 0-100 PSI

Description PRESSURE GAUGE

Serial Number 1593006

Accessory Received/Required NONE

Div/CC ID NONE Accessory to Asset No. N/A

Div/CC DIV20

Location B57

Custodian

RON GREEN

Tel. 5305

Charge/Project No. 20.00751.006

Proprietary/Confidential N

Date Required ROUTINE

Work Requested CALIBRATION

Receiving Inspection O.K.

Delivered By TROY MAXWELL

Tel. 2012

WORK HISTORY

Date	Start Time	Stop Time	Notes

SMI CALIBRATION BY: SM  
 CAL: 000446 01: 100000  
 Int: 000446 01: 100000  
 1 000 000 000 000 000 000

39531

PARTS

Part Name	Part Number	Cost	Failure Description

WORK SUMMARY

Failure Description

Repair Action

Cal Procedure CLCP-PI-001, 6/99 Temp 60 F Hum 46 %

Tech [Signature] Cal Hrs. 1.5 Repair Hrs. Part Cost

Action Taken [Signature]

Standards Used 4163

Date Cal 6-29-00 Int. 12 Mo. Date Due 6-29-01 Reliability Code

Date Picked Up 6-30-00  
workreq.rpt Rev 30 Jan 00

Picked Up By [Signature]

# PRESSURE CALIBRATION DATA SHEET

Date 6-29-00 Work Order 35931 Technician [Signature]  
 Inst Cust. Green Ext 5305 Charge # 20-00751-006 time 1.5

A) Unit Under Test Moore Press Gauge  
 Model \_\_\_\_\_ Serial No. 1593006 Asset No. 2416  
 Range 100 PSI Uncertainty Grade A Std Unc \_\_\_\_\_

B) Calibration Standard (1) Mensor  
 Model SD14 Serial No. 340119A Asset No. 4163  
 Uncertainty ±0.03 PSI Std Unc \_\_\_\_\_

C) Calibration Standard (2) N/A  
 Model \_\_\_\_\_ Serial No. \_\_\_\_\_ Asset No. \_\_\_\_\_  
 Uncertainty \_\_\_\_\_ Std Unc \_\_\_\_\_  
 Comb Unc (rss B&C) 0.003 PSI TUR (A Unc/Comb Unc) 33/1

If less than 4:1, Total combined calibration Unc ( $k \times \text{rssl}$ ) \_\_\_\_\_

k= \_\_\_\_\_ Explanation \_\_\_\_\_

Env: Room Temp. 68°F Humidity 46% Baro Press. 29.18" Hg

Conversion Factor(s) N/A

STANDARD	INCREASING	DECREASING	TOLERANCE: $\pm 1/2$	
			MIN	MAX
UNITS: <u>PSI</u>	UNITS: <u>PSI</u>	UNITS: <u>PSI</u>	UNITS: <u>PSI</u>	
AS FOUND				
<u>20</u>	<u>20</u>	<u>20.5</u>	<u>18</u>	<u>22</u>
<u>40</u>	<u>40.5</u>	<u>41</u>	<u>39</u>	<u>41</u>
<u>60</u>	<u>60.5</u>	<u>61</u>	<u>59</u>	<u>61</u>
<u>80</u>	<u>80.5</u>	<u>80.5</u>	<u>78</u>	<u>82</u>
<u>100</u>	<u>100.5</u>	<u>99</u>	<u>98</u>	<u>102</u>
AS DELIVERED				

NOTES:



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

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Certificate #

0972-01

## Certificate of Calibration

29 June 2000

**Issued to:** RON GREEN DIV20 B57  
**Manufacturer/Model:** MOORE PRODUCTS 0-100 PSI  
**Description:** PRESSURE GAUGE  
**Serial Number:** 1593006  
**Asset Number:** 002416

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: 68.0 Degrees Fahrenheit Humidity: 46 % RH

**Calibration Date:** 29 Jun 00 **Calibration Procedure:** CLCP-PI-001, 6/99

**Condition as Received:** In Tolerance

**Remarks:**

**Approved by:**

Jim Patterson, Supervisor, or Walt Hill, Metrologist

Certificate # 39531

m:\a2la.rpt Rev date 22 May 00

**Measurements performed by:**

Mack Wood, Technician

Page 1 of 1

# SOUTHWEST RESEARCH INSTITUTE

## Calibration Laboratory

### WORK ORDER

Processed by RCRUZ at 1:26:30PM on 8/3/01

|||||

**Work Order 444044685**

Arrived 8/3/01

Asset No. 002416 Manufacturer MOORE PRODUCTS Model 0-100 PSI

Instrument Type/Class PRESSURE GAUGE Serial No. 1593006

Accessory No. Calibration Procedure CLCP-PI-001, 6/99 Location B57

Div/Client DIV20 Custodian RON GREEN Mail Stop B57 Tel. 5305

Charge/Project No. 00751.006 1.20 Delivered By / Telephone TROY MAXWELL X

**IN4CAL**

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

### WORK NOTES

Date	Hours	Remarks/Notes
		Meets ANSI Grade B TIL (29/39)

South Cal Lab By: GWW  
CAL: Jan 28, 00 DUE: Jan 28, 01  
JOB: 002416 SER: 1593006

### REPAIR PARTS

Date	Hours	Part Name	Part Number	Failure Description	Cost

### WORK SUMMARY

Failure Description \_\_\_\_\_  
Repair Action \_\_\_\_\_  
Calibration Procedure \_\_\_\_\_ Temp 68 F Hum. 31 %  
Tech [Signature] Totals Cal Hours 1.0 Repair Hours \_\_\_\_\_ Parts Cost \_\_\_\_\_  
Standards Used 4163

Date Picked Up 10-12-01 Picked Up By [Signature]

444044685

**PRESSURE INDICATOR CALIBRATION DATA SHEET**

WORK ORDER #: 444044685    DATE: 8/7/01    TECH. *[Signature]*

UUT: Moore Products pressure gauge Units Code 1  
 ASN: 2416    LRP: 0    URP: 100    UNITS: PSI

RESOLUTION: 0.5    REPEATABILITY: 0    Grade ~~a~~ b

TOLERANCE +/-% : ~~0.5~~ n/a    zero (y/n) n    SPAN: 100    100

Grade tol    2    3    Analog or Digital? (a or d): a

CALIBRATION STANDARD    Setability: 0.003

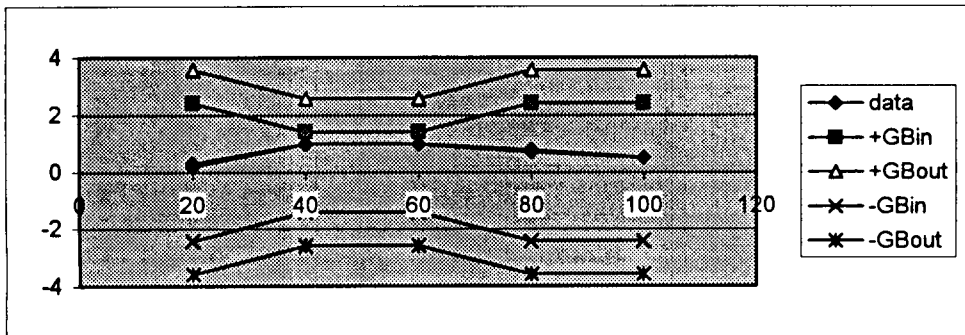
ASSET #: 4163    MFR: mensor    tolerance 0.03    PSI

UNCERTAINTY BUDGET @ F.S.			
description	value	divisor	std unc
UUT resolution	0.5	1.73205	0.288675
UUT repeatability	0	1	0
Calibration standard	0.03	1.73205	0.017321
Cal Std Setability	0.003	1.73205	0.001732
combined uncertainty			2.9E-01
expanded uncertainty	k = 2		5.8E-01

TAR= 66.7

TUR= 3.5

DATA		tolerance	2	3			
INPUT	READING	ERROR	UNCERT	GBin	GBout	PASS	FAIL
20	20.3	0.3	0.578399	2.421601	3.578399	P	
40	41	1	0.578399	1.421601	2.578399	P	
60	61	1	0.578399	1.421601	2.578399	P	
80	80.7	0.7	0.578399	2.421601	3.578399	P	
100	100.5	0.5	0.578399	2.421601	3.578399	P	
80	80.8	0.8	0.578399	2.421601	3.578399	P	
60	61	1	0.578399	1.421601	2.578399	P	
40	41	1	0.578399	1.421601	2.578399	P	
20	20.2	0.2	0.578399	2.421601	3.578399	P	



\*Instructions on Sheet 3



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

8 August 2001

**Issued to:** RON GREEN DIV20 B57  
**Manufacturer/Model:** MOORE PRODUCTS 0-100 PSI  
**Description:** PRESSURE GAUGE  
**Serial Number:** 1593006  
**Asset Number:** 002416  
**Work Order Number:** 444044685

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: 38 % RH

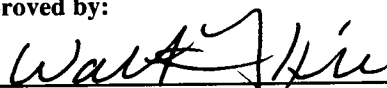
**Calibration Date:** 8 Aug 01 **Calibration Procedure:** CLCP-PI-001, 6/99

**Condition as Received:** IN TOLERANCE

**Condition as Released:** IN TOLERANCE

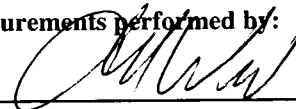
**Remarks:**

**Approved by:**

  
\_\_\_\_\_

Walt Hill, Supervisor  
Institute Calibration Laboratory

**Measurements performed by:**

  
\_\_\_\_\_

Mack Wood, 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:** T1  
**Contact:** RON GREEN  
**Manufacturer Model:** MOORE PRODUCTS 0-100 PSI  
**Description:** PRESSURE GAUGE  
**Serial No:** 1593006  
**Asset No:** 002416  
**Procedure:** CLCP-PI-001, 6/99

**Work Order:** 444051934  
**Date Issued:** Jan 21, 2003  
**Calibration Date:** Jan 21, 2003  
**\*\*Calibration Due:** Jan 21, 2004  
**Calibration Location:** N/A  
**Environment:** Temp. 68.0°F Hum. 40 %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/NCCL 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:** MEETS ANSI GRADE B TOLERANCE (2% MIDDLE HALF, 3% FIRST AND LAST QUARTER OF DIAL)  
TUR=3.5

### Standards Used

Asset	Manufacturer	Model	Description	Cal Due
004163	MENSOR	5014	PRESSURE CALIBRATOR	Apr 15, 03

Approved by: Walt Hill  
Metrology Group Leader  
m:\Nona21a1.rpt Rev date 15, August 02

Measurements by: Mack Wood  
Metrology Technician

