

CERTIFICATE OF CALIBRATION

Customer: MESA LABORATORIES
12100 WEST 6TH STREET
LAKEWOOD, CO 80228

Customer Nbr: 1-549853-000
PO Nbr: 0050943
Date Received: April 11, 2014

Cert/SO Nbr: 5-V2LU4-20-1
Manufacturer: Druck/Unomat/GE Sensing/Kaye
Model Nbr: DPI 520

Date Completed: April 22, 2014
Due Date: April 22, 2015

Description: Pressure Calibrator
Serial Nbr: 0417/97-4
ID Nbr: 10226
Unit Barcode: 901B0020195

Calibrated To: Manufacturer Specification
Calibration Proc: 1-AC19457-0
Item Received: In Tolerance
Item Returned: In Tolerance

Transcat Calibration Laboratories have been audited and found in compliance with ISO/IEC 17025:2005. Accredited calibrations performed within the Lab's Scope of Accreditation are indicated by the presence of the Accrediting Body's Logo and Certificate Number on this Certificate of Calibration. Any measurements on an accredited calibration not covered by that Lab's Scope are listed in the notes section of the certificate. This report must not be used to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the Federal Government.

Transcat calibrations, as applicable, are performed in compliance with the requirements of ISO 9001:2008, ISO TS16949, ANSI/NCSL Z540-1994, and ISO 10012-1992. When specified contractually, the requirements of 10CFR21, 10CFR50 App. B and NQA-1 are also covered.

Traceability includes no less than: An unbroken chain of comparison, realization of SI units, measurement uncertainty, documentation, competence, periodic recalibration, and measurement assurance. Transcat documents the traceability of measurements to the SI units through the National Institute of Standards and Technology (NIST) or the National Research Council of Canada (NRC), or other recognized national measurement institutes (NMI's) or international standard bodies, or to measurable conditions created in our laboratory, or accepted fundamental and/or natural physical constants, ratio type of calibration, or by comparison to consensus standards. The specific path of traceability for the reported measurement results is maintained at the Transcat facility and is available there for review.

Complete records of work performed are maintained by Transcat and are available for inspection. Laboratory standards used in the performance of this calibration are shown on the Supplemental Report.

The results in this report relate only to the item calibrated or tested, and the determination of in or out of tolerance is specific to the model/serial no. referenced above based on the tolerances shown on the supplemental report; these tolerances are either the original equipment manufacturer's (OEM's) warranted specifications or the client's requested specifications.


The applied uncertainty is the uncertainty of the calibration process. The Test Uncertainty Ratio (TUR) is calculated as per NCSL International RP-9, section 8.2. All calibrations have been performed using processes having a TUR of 4 : 1 or better (3:1 for mass calibrations), unless otherwise noted on the Supplemental Report. Uncertainties have been estimated at a 95 percent confidence level (k=2). Calibration at a 4:1 TUR (or greater) provides reasonable confidence that the instrument is within the stated tolerances. For measuring instruments, in order to consider the contribution to the uncertainty from reproducibility of the unit under test (UUT), add 0.6 of the UUT's least significant digit to the reported uncertainty. For mass calibrations: Conventional mass referenced to 8.0 g/cm³.

Any number of factors can cause a unit to drift out of tolerance at any time following its calibration. Limitations on the uses of this instrument are detailed in the OEM's operating instructions.

Notes:

Calibrated At:
1181 Brittmore
Houston, TX 77043
By: John R. Whitfield

Facility Responsible:
1181 Brittmore
Houston, TX 77043
713-465-4399

 **Digitally Signed By Scott D. Caine for**
Date: April 22, 2014

Scott Caine
Lab Manager

 Digitally Signed On April 22, 2014

Revision 0

This certificate may not be reproduced except in full, without the written approval of Transcat. Additional information, if applicable may be included on separate report(s).

SUPPLEMENTAL REPORT FOR 5-V2LU4-20-1

CALIBRATION LAB DATA AS FOUND

Service Order Nbr: 5-V2LU4-20-1
 Description: Pressure Calibrator
 Serial: 0417/97-4
 Customer: MESA LABORATORIES
 Calibrated: April 22, 2014
 Date Due: April 22, 2015
 Service Type: R9

Mfg: Druck/Unomat/GE Sensing/Kaye
 Model: DPI 520
 PO Nbr: 0050943
 ID Nbr: 10226
 Calibration Proc: 1-AC19457-0

Description	Setpoints	Accuracy	Low Limit	High Limit	As Found	$\frac{O}{I}$	Uncertainty (k=2; ±)	TUR
Pressure Measure								
Ambient Pressure	14.67psia	±(0.025% Rdg + 1 LSD)	14.66	14.68	14.66 psia		2.2e-004 psia	44.5 : 1
Pressure Linearity	10.12psia	±(0.005% FS + 1 LSD)	10.10	10.14	10.11 psia		1.6e-004 psia	100.0 : 1
	20.34psia	±(0.005% FS + 1 LSD)	20.32	20.36	20.33 psia		3.1e-004 psia	65.4 : 1
	39.27psia	±(0.005% FS + 1 LSD)	39.25	39.29	39.26 psia		5.8e-004 psia	34.6 : 1
	59.47psia	±(0.025% Rdg + 1 LSD)	59.45	59.49	59.46 psia		1.2e-003 psia	17.3 : 1
	79.85psia	±(0.025% Rdg + 1 LSD)	79.82	79.88	79.84 psia		1.5e-003 psia	19.4 : 1
	100.48psia	±(0.025% Rdg + 1 LSD)	100.44	100.52	100.47 psia		1.9e-003 psia	20.6 : 1
	119.45psia	±(0.025% Rdg + 1 LSD)	119.41	119.49	119.44 psia		2.3e-003 psia	17.4 : 1
	139.82psia	±(0.025% Rdg + 1 LSD)	139.78	139.86	139.82 psia		2.7e-003 psia	14.8 : 1
	160.03psia	±(0.025% Rdg + 1 LSD)	159.98	160.08	160.02 psia		3.1e-003 psia	16.2 : 1

The reported uncertainty is the uncertainty of the calibration process. For measuring instruments, add 0.6 of the least significant digit to the reported uncertainty to obtain the measurement uncertainty of the unit under test at the specific test point. Reported resolution of the UUT does not represent calibration uncertainty or accuracy of the UUT.

SUPPLEMENTAL REPORT FOR 5-V2LU4-20-1

CALIBRATION LAB DATA AS FOUND

Description	Setpoints	Accuracy	Low Limit	High Limit	As Found	UUT	Uncertainty (k=2; ±)	TUR
	180.43psia	±(0.025% Rdg + 1 LSD)	180.37	180.49	180.43 psia		3.5e-003 psia	17.3 : 1
	199.55psia	±(0.025% Rdg + 1 LSD)	199.49	199.61	199.55 psia		3.8e-003 psia	15.6 : 1
Hysteresis	119.45psia	±(0.025% Rdg + 1 LSD)	119.41	119.49	119.44 psia		2.3e-003 psia	17.4 : 1
	100.48psia	±(0.025% Rdg + 1 LSD)	100.44	100.52	100.47 psia		1.9e-003 psia	20.6 : 1
	79.85psia	±(0.025% Rdg + 1 LSD)	79.82	79.88	79.85 psia		1.5e-003 psia	19.4 : 1

As Found Data recorded on April 22, 2014

Temperature: 69.0°F / 20.6°C Relative Humidity: 53% Temp/RH Asset: Dewk12

Asset: DW09 Manufacturer: Fluke/DH Instruments Model: PG7601 Description: Piston Gauge Cal Date: June 27, 2012 Due Date: June 30, 2014 Traceability Numbers: 1500135946

The reported uncertainty is the uncertainty of the calibration process. For measuring instruments, add 0.6 of the least significant digit to the reported uncertainty to obtain the measurement uncertainty of the unit under test at the specific test point. Reported resolution of the UUT does not represent calibration uncertainty or accuracy of the UUT.

SUPPLEMENTAL REPORT FOR 5-V2LU4-20-1

CALIBRATION LAB DATA AS LEFT

Service Order Nbr: 5-V2LU4-20-1 Description: Pressure Calibrator Serial: 0417/97-4 Customer: MESA LABORATORIES Calibrated: April 22, 2014 Date Due: April 22, 2015 Service Type: R9	Mfg: Druck/Unomat/GE Sensing/Kaye Model: DPI 520 PO Nbr: 0050943 ID Nbr: 10226 Calibration Proc: 1-AC19457-0
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Description	Setpoints	Accuracy	Low Limit	High Limit	As Left	Uncertainty (k=2; ±)	TUR
Pressure Measure							
Ambient Pressure	14.67psia	±(0.025% Rdg + 1 LSD)	14.66	14.68	14.66 psia	2.2e-004 psia	44.5 : 1
Pressure Linearity	10.12psia	±(0.005% FS + 1 LSD)	10.10	10.14	10.11 psia	1.6e-004 psia	100.0 : 1
	20.34psia	±(0.005% FS + 1 LSD)	20.32	20.36	20.33 psia	3.0e-004 psia	66.4 : 1
	39.27psia	±(0.005% FS + 1 LSD)	39.25	39.29	39.26 psia	5.9e-004 psia	34.0 : 1
	59.47psia	±(0.025% Rdg + 1 LSD)	59.45	59.49	59.46 psia	1.2e-003 psia	25.8 : 1
	79.85psia	±(0.025% Rdg + 1 LSD)	79.82	79.88	79.84 psia	1.5e-003 psia	19.4 : 1
	100.48psia	±(0.025% Rdg + 1 LSD)	100.44	100.52	100.47 psia	1.9e-003 psia	20.7 : 1
	119.45psia	±(0.025% Rdg + 1 LSD)	119.41	119.49	119.44 psia	2.3e-003 psia	17.3 : 1
	139.82psia	±(0.025% Rdg + 1 LSD)	139.78	139.86	139.82 psia	2.7e-003 psia	18.5 : 1
	160.03psia	±(0.025% Rdg + 1 LSD)	159.98	160.08	160.02 psia	3.1e-003 psia	16.2 : 1

The reported uncertainty is the uncertainty of the calibration process. For measuring instruments, add 0.6 of the least significant digit to the reported uncertainty to obtain the measurement uncertainty of the unit under test at the specific test point. Reported resolution of the UUT does not represent calibration uncertainty or accuracy of the UUT.

SUPPLEMENTAL REPORT FOR 5-V2LU4-20-1

CALIBRATION LAB DATA AS LEFT

Description	Setpoints	Accuracy	Low Limit	High Limit	As Left	$\frac{O}{Q}$	Uncertainty (k=2; ±)	TUR
	180.43psia	±(0.025% Rdg + 1 LSD)	180.37	180.49	180.43 psia		3.5e-003 psia	17.3 : 1
	199.55psia	±(0.025% Rdg + 1 LSD)	199.49	199.61	199.55 psia		3.8e-003 psia	15.6 : 1
Hysteresis	119.45psia	±(0.025% Rdg + 1 LSD)	119.41	119.49	119.44 psia		2.3e-003 psia	17.3 : 1
	100.48psia	±(0.025% Rdg + 1 LSD)	100.44	100.52	100.47 psia		1.9e-003 psia	20.7 : 1
	79.85psia	±(0.025% Rdg + 1 LSD)	79.82	79.88	79.85 psia		1.5e-003 psia	19.4 : 1

As Left Data recorded on April 22, 2014

Temperature: 69.0°F / 20.6°C Relative Humidity: 53% Temp/RH Asset: Dewk12

Asset	Manufacturer	Model	Description	Cal Date	Due Date	Traceability Numbers
DW09	Fluke/DH Instruments	PG7601	Piston Gauge	June 27, 2012	June 30, 2014	1500135946

The reported uncertainty is the uncertainty of the calibration process. For measuring instruments, add 0.6 of the least significant digit to the reported uncertainty to obtain the measurement uncertainty of the unit under test at the specific test point. Reported resolution of the UUT does not represent calibration uncertainty or accuracy of the UUT.