Calibration Results

Oak Ridge National Laboratory

ORNL Metrology Laboratory
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Unit Under Test Information		Customer Information	Test Information	
Manufacturer:	SWAGELOK	Mark Loguillo	Overall Result:	PASS
Description:	SAMPLE CYLINDER	Badge 00915291	Performed on:	09/09/2014
Model Number:	316L-50DF4-500	Mail Stop 6461	Next Cal Due:	09/09/2015
Serial Number:	NA	Bldg 8600 Room C-256	Performed by:	U025711
Asset / ID Number:	A001820	Phone 865-235-9000	Environment:	22.9°C 43%Rh
Custodian:	LOGUILLO M		Condition F/L:	FOUND-LEFT
Work Order Number:	MC524466		Procedure used:	STANDARD VOLUME DETERMINATION PPC4/HQS Rev 1.0
Notes:				

Asset No.

Work Order No.

ORNL Metrology Laboratory (ORNL ML) certifies that the above listed instrument meets or exceeds all specifications as stated in the referenced procedure unless otherwise noted. This Report of Calibration applies only to the item being calibrated, identified above. This report contains data that are not covered by the NVLAP Scope of Accreditation.

This calibration report documents the traceability to national standards, which realize the units of measurement according to the International System of Units (SI). Calibration data and conformity assessment (Pass/Fail decision) is limited to the performance of the instrument at the time of test. The "Next Cal Due" date is based on manufacturer's recommendations or best calibration practices and with customer agreement (in the case of external ORNL customers); the instrument should not be used past this date without recalibration. This report shall not be reproduced, except in full, unless written permission for an approved abstract is obtained from ORNL ML. Any report containing accredited data shall not be used to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the Federal Government. Calibration reports without authorizing signature(s) are not valid.

For accredited data, measurement uncertainties at the time of test, expressed in base units, are given on the following pages, where applicable. They are calculated in accordance with the methods described in EA-4/02, NIST TN1297, DKD-3, or other applicable documents that comply with the Guide to the Uncertainty in Measurement (GUM), using a coverage factor of k=2, corresponding to a confidence level of approximately 95%. Unless otherwise indicated, any conformity determination in this report is based on a Test Uncertainty Ratio (TUR) of 4:1 or greater. Any TUR less than 4:1 will be identified in the test data. It is the responsibility of the instrument custodian, with the assistance of his/her Quality Representative, to determine whether this level of confidence for the determination of conformance is adequate for the intended use of this instrument.

This calibration was performed using measurement standards traceable to the appropriate standard(s), maintained by the National Institute of Standards and Technology (NIST), to accepted intrinsic standards of measurement, or is derived by ratio type self-calibration techniques. The calibration system used to derive accredited data complies with the requirements of NIST Handbook 150, ANSI/NCSL Z540.1-1999 (R2002), ISO/IEC 17025.

Standards Used

Asset #	Description	Cal Date	Due Date
M095802	HEISE HQS-2 PRESSURE MODULE	04/01/2014	04/01/2015
M139869	OAK RIDGE NATIONAL LABORATORY NONE STANDARD VOLUME	03/05/2014	03/05/2015
M139871	OAK RIDGE NATIONAL LABORATORY NONE STANDARD VOLUME	03/05/2014	03/05/2015
M212994	HEISE ST-2H INDICATOR DIGITAL	09/08/2014	03/08/2015

Test Data

UUT RANGE/ COMMENT	STANDARD READING	STANDARD MODIFIER	UUT READING	UUT TOLERANCE	UUT ERROR	% TOL	MEASUREMENT UNCERTAINTY	ACCRED	TEST RESULTS

INITIAL INSPECTION

No Calibration Seals found on the UUT.

Instrument was received in good, functional condition.

VOLUME TESTS

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STD Volume= 20.03799cc

Header Base (psia)	Header Test (psia)	Header Equal (psia)	Header + STD (cc)	DUT Base (psia)	DUT Test (psia)	DUT Equal (psia)	DUT Volume (cc)
0.296	20.010	6.018	28.23249	0.299	20.000	1.370	491.10290
0.296	20.009	6.018	28.23307	0.297	20.001	1.369	490.70763
0.295	20.008	6.018	28.23509	0.298	20.001	1.369	491.20092

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STD Volume= 99.95029cc

Header Base (psia)	Header Test (psia)	Header Equal (psia)	Header + STD (cc)	DUT Base (psia)	DUT Test (psia)	DUT Equal (psia)	DUT Volume (cc)
0.297	20.006	1.793	108.16012	0.299	19.998	3.849	492.02191
0.296	20.009	1.793	108.16425	0.297	19.997	3.848	491.90215
0.297	20.008	1.793	108.15922	0.298	19.998	3.849	491.87925

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Calculated Volume= 491.46913cc

Standard Deviation= 0.53800cc

Uncertainty= 0.43% or 2.104cc

***** End of Data *****

Joe Keck (1nk)

Digitally signed by Joe Keck (1nk)
Date: 2014.09.10 14:22:31 -04'00'

Metrology Engineer/Operations Coordinator