Bauske, Shelly A.

From: Haugen, Mark <Mark.Haugen@magellanlp.com>
Sent: Wednesday, October 18, 2017 12:39 PM
To: Bauske, Shelly A.
Cc: Ukele, Cassandra
Subject: Updated: Request For Variance Permit Magellan Grand Forks, ND Terminal

Shelly,

Magellan Pipeline Company is requesting a variance permit to use the atmospheric tank prover SN 966647 located at our Grand Forks, ND loading terminal that is not certified as traceable by a NIST-recognized metrology laboratory. We are requesting the variance because the prover is stationary and would require structural modifications to be made to the prover to transport the prover to a NIST recognized metrology lab.

Magellan Pipeline Company accepts the certifications for the standards, including the thermometers, that Meter Engineers, Inc. used to perform the prover calibration dated 7/24/2017.

Regards,

Mark

Mark Haugen
Magellan Midstream Partners, L.P.
709 3rd Ave West
Alexandria, MN 56308
PH: 320-762-1193 Ext. 21
CL: 320-808-6352
mark.haugen@magellanlp.com

Mark Haugen
Alexandria Area Operations
PH: 320-762-1193 Ext. 21
CL: 320-808-6352
mark.haugen@magellanlp.com

Bauske, Shelly A.

From: Haugen, Mark <Mark.Haugen@magellanlp.com>
Sent: Friday, October 06, 2017 2:16 PM
To: Bauske, Shelly A.
Cc: Crockford, Konrad S.; Ukele, Cassandra
Subject: RE: Registered Service Company Renewal - Self-Certification
Attachments: Fargo Calibration Open Top Prover Report Meter Engineers.pdf; Grand Forks Application Magellan.pdf; Grand Forks Calibration Open Top Prover Meter Engineers.pdf; West Fargo Application Magellan.pdf

Shelly,

I have attached the Application For Registration As A Registered Service Company along with the Calibration Reports from Meter Engineers, Inc. for Magellan Pipeline Company's West Fargo and Magellan Pipeline Company's Grand Forks Terminals. As I recall we had to request a variance in August of 2015 and will need to request a variance for 2017 as well.

Please let me know if you need additional information.

Regards,
Mark

Mark Haugen
Magellan Midstream Partners, L.P.
709 3rd Ave West
Alexandria, MN 56308
PH: 320-762-1193 Ext. 21
CL: 320-808-6352
mark.haugen@magellanlp.com

From: Bauske, Shelly A. [mailto:sbauske@nd.gov]
Sent: Thursday, October 05, 2017 8:59 AM
To: Haugen, Mark <Mark.Haugen@magellanlp.com>
Cc: Crockford, Konrad S. <kcrockford@nd.gov>
Subject: Registered Service Company Renewal - Self-Certification

Good Morning Mark

The Registered Service Company Permit for Magellan Midstream Partners, L.P. expired on August 12, 2017.

The Application for Registration as a Registered Service Company is found at: https://psc.nd.gov/forms/weights/registered-service-company.pdf. Please complete and return the application

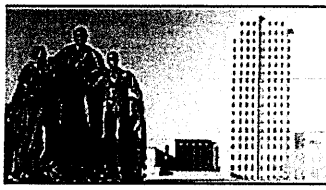
along with current calibration reports for your service standards, issued by a NIST-recognized metrology laboratory, and other applicable items no later than November 1, 2017.

If certification of the provers located in Grand Forks and West Fargo cannot be completed by a NIST-recognized metrology lab, you must request a variance to use the atmospheric tank prover that is not certified as traceable by a NIST-recognized metrology laboratory. The temporary variance permit issued on December 8, 2015 has expired (a copy of the West Fargo variance permit is attached).

If you have any questions, please contact me. Thank you!

Shelly Bauske
Public Service Commission
600 E Boulevard Ave Dept 408
Bismarck ND 58505-0480
701-328-4070
701-328-2410 (fax)
sbauske@nd.gov

North Dakota nd.gov Official Portal for North Dakota State Government



SECRETARY OF STATE
NORTH DAKOTA

MAGELLAN MIDSTREAM PARTNERS, L.P.

Partnership Details

System ID: 18153200
Type: Limited Partnership
Status: Active & Good Standing
Original File Date: 06/11/2002
State of Origin: Delaware

Phone: (888) 934-6571
Effective Date: 06/11/2002

Principal Office

ONE WILLIAMS CENTER
TULSA, OK 74172-0140

Registered Agent

C T CORPORATION SYSTEM
314 E THAYER AVE
BISMARCK, ND 58501-4018
Established Date: Aug 27, 2008

Nature of Business

OWNS AND OPERATES PETROLEUM PIPELINE

General/Managing Partners

MAGELLAN GP, LLC
ONE WILLIAMS CENTER MD28-1
PO BOX 22186
TULSA, OK 74121-2186

Return to Search Results

5KE7G3J4

Meter Engineers, Inc.

Customer	Magellan
Location	Grand Forks, ND
Designation	Truck Rack
Serial	966647
Prover Type	Atmospheric Tank
Date Completed	7/24/2017

Certificate of Calibration

7/24/2017

This is to certify that Meter Engineers, Inc. calibrated subject Atmospheric Tank meter prover and established the volume at 60 degrees fahrenheit and atmospheric pressure, to be:

New Prover Volume

If No corrections Needed		WITH Corrections
Tank Volume gal	1,000.120	Tank Volume gal
Tank Volume inches	231,027.504	Tank Volume inches
Tank Volume barrels	23.812	Tank Volume barrels

The calibrating medium used was water and the calibration was performed in accordance with the latest edition of the API Standards Chapters 4, 11, & 12 by Mike Norman and certified by the undersigned. Test performed using trailer unit number 134.

Certified Test Measures Used:

Measure #	Gal	NIST #
1	100	7241
2	100	7240
3	50	7242

Signed Bob Tack

Printed 7/24/2017

Meter Engineers, Inc.

Customer	Magellan
Location	Grand Forks, ND
Designation	Truck Rack
Serial	966647
Prover Type	Atmospheric Tank
Date Completed	7/24/2017

Tank Run Comparisons

Established Prover Volume

Tank Volume gal	1000
Tank Volume inches	231000
Tank Volume barrels	23.8095238

These values represent the design or initial volumes before any needed corrections.

Check Runs

Run 1 = 231,015.2964

Run 2 = 231,039.712

0.0106 %

Avg	Volume Diff 1 &2 to Established %
231,027.504	0.0119 %

Calibration Calculations

Established Vol		Avg Run Volume		Linear Measurement of Scale		
231000	-	231027.504	X		=	?

Scale Reading

Temp of Can

Scale was moved down ? inches which corresponds to the prover volume correction needed of -27.5042 cubic inches. Measure volume of can is temperature compensated.

Verification Runs (After Correction if any)

Run =

Run =

Avg	Volume Diff & to Established %
	-100 %

New Prover Volume

If No corrections Needed		WITH Corrections
Tank Volume gal	1,000.120	Tank Volume gal
Tank Volume inches	231,027.504	Tank Volume inches
Tank Volume barrels	23.812	Tank Volume barrels

Printed 7/24/2017

Meter Engineers, Inc.

Customer	Magellan
Location	Grand Forks, ND
Designation	Truck Rack
Serial	966647
Prover Type	Atmospheric Tank

Prover Information

Prover Type	Atmospheric Tank
Designation	Truck Rack
Serial	966647
Mfg of Prover	Brown Tank Co.
Coated?	Yes
Insulated?	No
Metallic Composition	Carbon Steel
Coefficient of Cubical Expansion	.0000186
Modulus of Elasticity	30000000
Notes	

Prover Information Verified By: Keith Petron

Customer Representative – Print Name

Methodology

CTL Temperature Correction Factor is based on API Petroleum Measurement manual Chapter 11.2.3

CTS Metal Correction Factor =(1 + ((Can Temp in F - 60) times the Can Coefficient of Expansion)) divided by (1 + ((Prover Temp in F - 60) times the Prover Coefficient of Expansion))

Meter Engineers, Inc.

Customer	Magellan
Location	Grand Forks, ND
Designation	Truck Rack
Serial	966647
Prover Type	Atmospheric Tank
Date Completed	7/24/2017

Run Calculation Summary

Mike Norman

Run # 1 (Tank)

Measure	Certified Volume	Scale Reading	Actual Volume	Prover Temp	Can Temp	CTL Temp Correction	CTS Metal Correction	Adjusted Volume
Can # 1 100 gal	23,093.63	0	23,093.63	72.5	73	0.999935	1.000112	23,094.7152
Can # 2 100 gal	23,092.99	0	23,092.99	72.5	72.9	0.999948	1.000109	23,094.3062
Can # 3 50 gal	11,548.56	2	11,550.56	72.5	72.8	0.999961	1.000106	11,551.3338
Can # 1 100 gal	23,093.63	0	23,093.63	72.5	72.9	0.999948	1.000109	23,094.9462
Can # 2 100 gal	23,092.99	0	23,092.99	72.5	72.9	0.999948	1.000109	23,094.3062
Can # 3 50 gal	11,548.56	0	11,548.56	72.5	72.8	0.999961	1.000106	11,549.3337
Can # 1 100 gal	23,093.63	0	23,093.63	72.5	72.8	0.999961	1.000106	23,095.1772
Can # 2 100 gal	23,092.99	0	23,092.99	72.5	72.9	0.999948	1.000109	23,094.3062
Can # 3 50 gal	11,548.56	2	11,550.56	72.5	73.0	0.999935	1.000112	11,551.1028
Can # 1 100 gal	23,093.63	5	23,098.63	72.5	73.0	0.999935	1.000112	23,099.7155
Can # 2 100 gal	23,092.99	55	23,147.99	72.5	73.0	0.999935	1.000112	23,149.0778
Can # 3 50 gal	11,548.56	-2	11,546.56	72.5	73.1	0.999922	1.000114	11,546.9756

Temperature Adjusted Volume This Run 231,015.2964

Run # 2 (Tank)

Measure	Certified Volume	Scale Reading	Actual Volume	Prover Temp	Can Temp	CTL Temp Correction	CTS Metal Correction	Adjusted Volume
Can # 1 100 gal	23,093.63	0	23,093.63	73.4	73.8	0.999947	1.000117	23,095.1078
Can # 2 100 gal	23,092.99	0	23,092.99	73.4	73.8	0.999947	1.000117	23,094.4678
Can # 3 50 gal	11,548.56	0	11,548.56	73.4	73.8	0.999947	1.000117	11,549.2990

Run Calculation Summary (cont)

Can # 1 100 gal	23,093.63	0	23,093.63	73.4	73.7	0.999960	1.000114	23,095.3388
Can # 2 100 gal	23,092.99	0	23,092.99	73.4	73.8	0.999947	1.000117	23,094.4678
Can # 3 50 gal	11,548.56	10	11,558.56	73.4	73.7	0.999960	1.000114	11,559.4153
Can # 1 100 gal	23,093.63	0	23,093.63	73.4	73.8	0.999947	1.000117	23,095.1078
Can # 2 100 gal	23,092.99	0	23,092.99	73.4	73.8	0.999947	1.000117	23,094.4678
Can # 3 50 gal	11,548.56	-10	11,538.56	73.4	73.8	0.999947	1.000117	11,539.2984
Can # 1 100 gal	23,093.63	60	23,153.63	73.4	73.8	0.999947	1.000117	23,155.1117
Can # 2 100 gal	23,092.99	25	23,117.99	73.4	73.8	0.999947	1.000117	23,119.4694
Can # 3 50 gal	11,548.56	-1	11,547.56	73.4	73.9	0.999933	1.000119	11,548.1604

Temperature Adjusted Volume This Run 231,039.7120

Printed 7/24/2017

Meter Engineers, Inc.

WaterDraw Calibration Worksheet

Customer	Magellan
Location	Grand Forks, ND
Designation	Truck Rack
Serial	966647
Prover Type	Atmospheric Tank

Technician: Mike Norman
Scale Reading: 59.3 cubic inches
Tolerance:46.2 cubic inches

Date: 07-24-17

	1 Run	Prv Temp	Pres	Time	2 Run	Prv Temp	Pres	Time	3 Run	Prv Temp	Pres	Time
		72.5				73.4						

Measure			Scale Reading	Temp	Scale Reading	Temp	Scale Reading	Temp
Can # 1	100 gal	1	0	73.0	0	73.8		
Can # 2	100 gal	2	0	72.9	0	73.8		
Can # 3	50 gal	3	+2	72.8	0	73.8		
Can # 1	100 gal	1	0	72.9	0	73.7		
Can # 2	100 gal	2	0	72.9	0	73.8		
Can # 3	50 gal	3	0	72.8	+10	73.7		
Can # 1	100 gal	1	0	72.8	0	73.8		
Can # 2	100 gal	2	0	72.9	0	73.8		
Can # 3	50 gal	3	+2	73.0	-10	73.8		
~~Can # 1~~	100 gal	1	+5	73.0	+60	73.8		
Can # 2	100 gal	2	+55	73.0	+25	73.8		
Can # 3	50 gal	3	-2	73.1	-1	73.9		
			Total		Total		Total	

Thermometer Numbers: 4P6153 1630273

Witnesses:	(Company)	Witnesses:	(Company)
	MET		
Keith Fetron	MMP		

UNITED STATES DEPARTMENT OF COMMERCE
National Institute of Standards and Technology
Gaithersburg, Maryland 20899-8361

REPORT OF CALIBRATION

FOR

A ONE HUNDRED (100) GALLON VOLUME PROVER
(Graduated Neck Type)

February 25, 2014

Manufacturer: Seraphin
Rancocas, NJ

NIST Seal Number: 7240
NIST Valve Seal No.: 001058
Material: Stainless Steel
Serial Number: 2470-B

submitted by

Meter Engineers, Inc.
7718 W. 53rd St. N
Maize, KS 67101

(Reference: Purchase Order Number 007468; dated February 4, 2014)

The volume of the prover described above was measured by the gravimetric method [1] and the standards used in this calibration are traceable to the System International through national standards. The gravimetric method uses the weight of the fluid necessary to fill the prover and the fluid density to calculate the volume. The fluid used was water from a reverse osmosis system and the prover was leveled using the vertical surface of the neck.#

The contained volume was drained from the prover by opening the valve at the bottom of the vessel. When this flow finished, the valve was held open for 30 seconds to complete the drain procedure. The delivered volume is for the scale reading of zero (0) and has been corrected for the reference temperature in Table 1 assuming a volumetric coefficient of expansion of 0.0000477 per °C (0.0000265 per °F) for the prover material.

---

1 Bean, V. E., Espina, P. I., Wright, J. D., Houser, J. F., Sheckels, S. D., and Johnson, A. N., "NIST Calibration Services for Liquid Volume," NIST Special Publication 250-72, National Institute of Standards and Technology, November 24, 2009.

One level indication was made in line with the neck scale and the other 90° to that indication, as stated in API MPMS Chapter 4.7. The levels on the can were not used.

Table 1. Delivered volume for the tested vessel for a scale reading of zero.

	Volume Delivered
gal at 60 °F	99.9696
in^3 at 60 °F	23092.99

The volume measurement procedure was repeated 5 times with the neck scale filled approximately to zero each time. The repeatability of the 5 measurements was 30 parts in 10^6 and the expanded uncertainty in the measured volume is ±0.009%. It was calculated according to References [1] and [2] with a 95 % confidence level† and is traceable to NIST mass, temperature, pressure, and humidity standards, and a NIST water density determination.

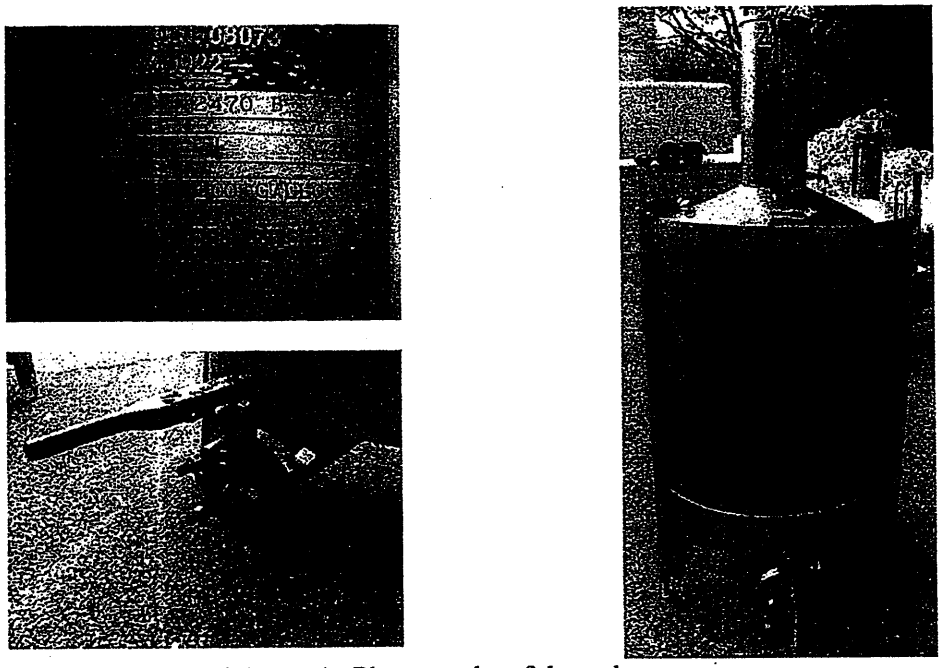


Figure 1. Photographs of the volume prover.

The input data used for calculation of the prover volume are given in the spreadsheet attached to this report. The calibration and uncertainties presented here are only valid over the range of the

[2] Taylor, B. N. and Kuyatt, C. E., "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Results," NIST Technical Note 1297, National Institute of Standards and Technology (January 1993).

† Coverage factor of 2.12 for 16 effective degrees of freedom.

NIST calibration of this test measure. When the test measure is applied by the customer to measure liquid volume, uncertainties beyond the NIST calibration must be considered, for example: leveling of the test measure, reading the meniscus, cleanliness of the test measure interior, drainage effects due to liquid viscosity, etc.

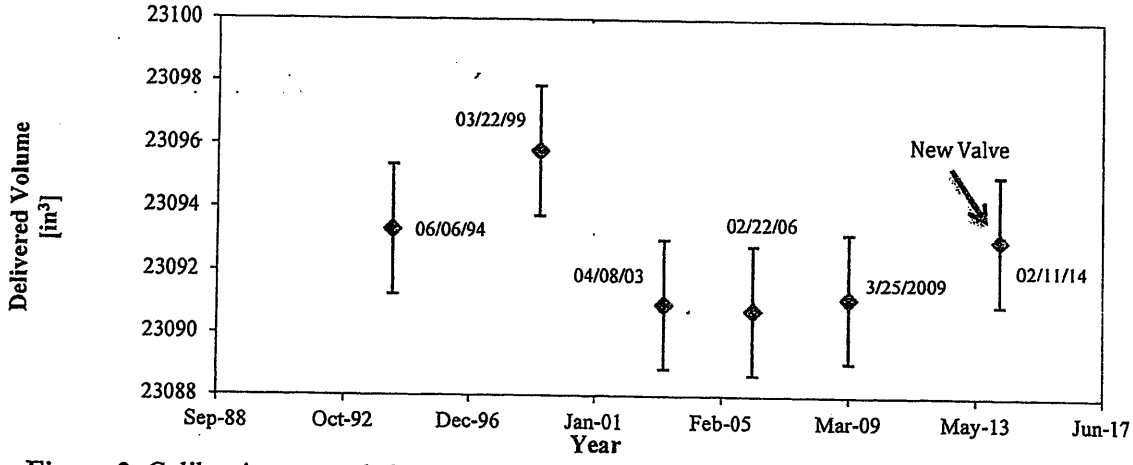


Figure 2. Calibration control chart for 100 gallon graduated neck test measure SN 2470-B

Table 2. Results of prior calibrations for the delivered volume.

Date	*Delivered Volume [in³]*	*Difference from Prior [in³]*	*Degree of Equivalence [-]*
02/11/14	23092.99	2.26	0.38
03/25/09	23091.12	0.39	0.07
02/22/06	23090.74	-0.19	-0.03
04/08/03	23090.93	-4.87	-0.83
03/22/99	23095.80	2.50	0.42
06/06/94	23093.30	-	-

For the Director,
National Institute of Standards and Technology

Dr. John D. Wright
Project Leader
Fluid Metrology Group
Physical Measurement Laboratory
National Institute of Standards and Technology

Sherry Sheckels
Calibration Technician
Fluid Metrology Group
Physical Measurement Laboratory
National Institute of Standards and Technology

UNITED STATES DEPARTMENT OF COMMERCE
National Institute of Standards and Technology
Gaithersburg, Maryland 20899-8361

REPORT OF CALIBRATION

FOR

A ONE HUNDRED (100) GALLON VOLUME PROVER
(Graduated Neck Type)

February 25, 2014

Manufacturer: Seraphin
Rancocas, NJ

NIST Seal Number: 7241
NIST Valve Seal No.: 001059
Material: Stainless Steel
Serial Number: 2470-A

submitted by

Meter Engineers, Inc.
7718 W. 53rd St. N
Maize, KS 67101

(Reference: Purchase Order Number 007468; dated February 4, 2014)

The volume of the prover described above was measured by the gravimetric method [1] and the standards used in this calibration are traceable to the System International through national standards. The gravimetric method uses the weight of the fluid necessary to fill the prover and the fluid density to calculate the volume. The fluid used was water from a reverse osmosis system and the prover was leveled using the vertical surface of the neck.#

The contained volume was drained from the prover by opening the valve at the bottom of the vessel. When this flow finished, the valve was held open for 30 seconds to complete the drain procedure. The delivered volume is for the scale reading of zero (0) and has been corrected for the reference temperature in Table 1 assuming a volumetric coefficient of expansion of 0.0000477 per °C (0.0000265 per °F) for the prover material.

---

1 Bean, V. E., Espina, P. I., Wright, J. D., Houser, J. F., Sheckels, S. D., and Johnson, A. N., "NIST Calibration Services for Liquid Volume," NIST Special Publication 250-72, National Institute of Standards and Technology, November 24, 2009.

One level indication was made in line with the neck scale and the other 90° to that indication, as stated in API MPMS Chapter 4.7. The levels on the can were not used.

Table 1. Delivered volume for the tested vessel for a scale reading of zero.

	Volume Delivered
gal at 60 °F	**99.9724**
in^3 at 60 °F	**23093.63**

The volume measurement procedure was repeated 5 times with the neck scale filled approximately to zero each time. The repeatability of the 5 measurements was 23 parts in 10^6 and the expanded uncertainty in the measured volume is ±0.008%. It was calculated according to References [1] and [2] with a 95 % confidence level† and is traceable to NIST mass, temperature, pressure, and humidity standards, and a NIST water density determination.

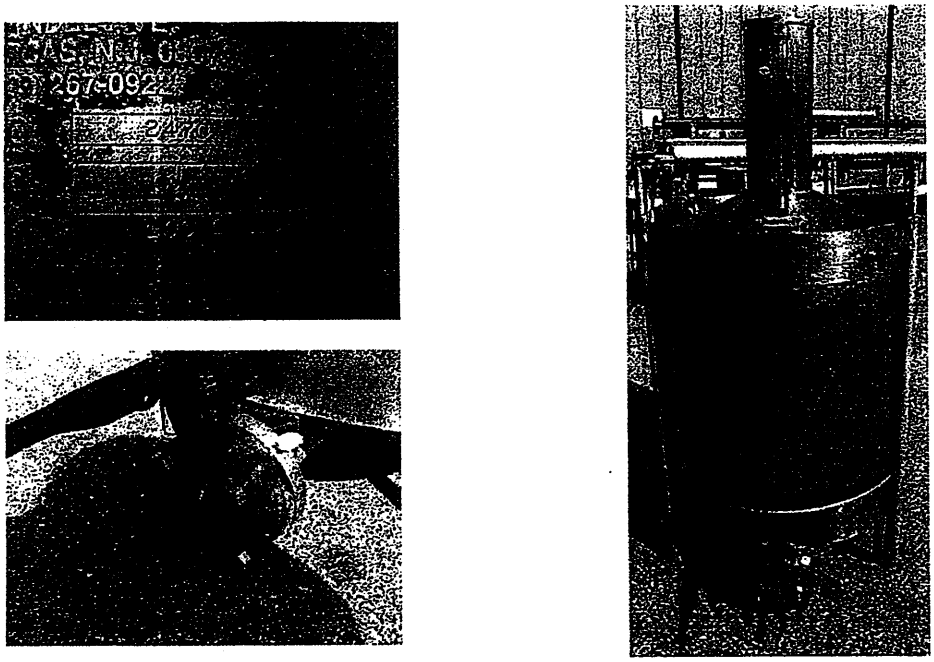


Figure 1. Photographs of the volume prover.

The input data used for calculation of the prover volume are given in the spreadsheet attached to this report. The calibration and uncertainties presented here are only valid over the range of the

[2] Taylor, B. N. and Kuyatt, C. E., "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Results," NIST Technical Note 1297, National Institute of Standards and Technology (January 1993).

† Coverage factor of 2.09 for 21 effective degrees of freedom.

NIST calibration of this test measure. When the test measure is applied by the customer to measure liquid volume, uncertainties beyond the NIST calibration must be considered, for example: leveling of the test measure, reading the meniscus, cleanliness of the test measure interior, drainage effects due to liquid viscosity, etc.

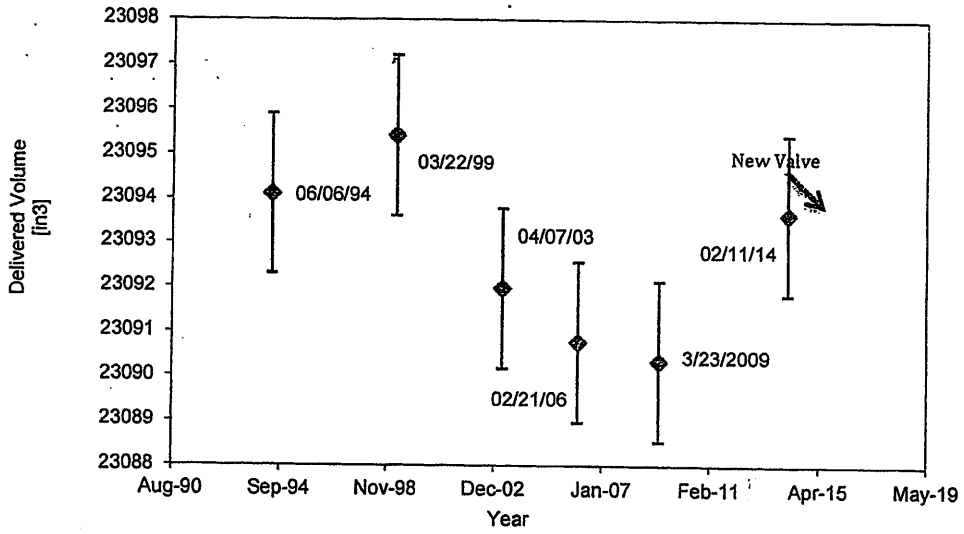


Figure 2. Calibration control chart for 100 gallon graduated neck test measure SN 2470-A

Table 2. Results of prior calibrations for the delivered volume.

Date	*Delivered Volume [in^3]*	*Difference from Prior [in^3]*	*Degree of Equivalence [-]*
02/11/14	23093.63	2.86	0.49
03/23/09	23090.34	-0.43	-0.07
02/21/06	23090.77	-1.20	-0.20
04/07/03	23091.97	-3.43	-0.58
03/22/99	23095.40	1.30	0.22
06/06/94	23094.10	-	-

For the Director,
National Institute of Standards and Technology

Dr. John D. Wright
Project Leader
Fluid Metrology Group
Physical Measurement Laboratory
National Institute of Standards and Technology

Sherry Sheckels
Calibration Technician
Fluid Metrology Group
Physical Measurement Laboratory
National Institute of Standards and Technology

UNITED STATES DEPARTMENT OF COMMERCE
National Institute of Standards and Technology
Gaithersburg, Maryland 20899-8361

REPORT OF CALIBRATION

FOR

A FIFTY (50) GALLON VOLUME PROVER
(Graduated Neck Type)

February 25, 2014

Manufacturer: Seraphin
Rancocas, NJ

NIST Seal Number: 7242
NIST Valve Seal No.: 001060
Material: Stainless Steel
Serial Number: 7293-C

submitted by

Meter Engineers, Inc.
7718 W. 53rd St. N
Maize, KS 67101

(Reference: Purchase Order Number 007468; dated February 4, 2014)

The volume of the prover described above was measured by the gravimetric method [1] and the standards used in this calibration are traceable to the System International through national standards. The gravimetric method uses the weight of the fluid necessary to fill the prover and the fluid density to calculate the volume. The fluid used was water from a reverse osmosis system and the prover was leveled using the vertical surface of the neck.#

The contained volume was drained from the prover by opening the valve at the bottom of the vessel. When this flow finished, the valve was held open for 30 seconds to complete the drain procedure. The delivered volume is for the scale reading of zero (0) and has been corrected for the reference temperature in Table 1 assuming a volumetric coefficient of expansion of 0.0000477 per °C (0.0000265 per °F) for the prover material.

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1 Bean, V. E., Espina, P. I., Wright, J. D., Houser, J. F., Sheckels, S. D., and Johnson, A. N., "NIST Calibration Services for Liquid Volume," NIST Special Publication 250-72, National Institute of Standards and Technology, November 24, 2009.

One level indication was made in line with the neck scale and the other 90° to that indication, as stated in API MPMS Chapter 4.7. The levels on the can were not used.

Table 1. Delivered volume for the tested vessel for a scale reading of zero.

	Volume Delivered
gal at 60 °F	49.9937
in^3 at 60 °F	11548.56

The volume measurement procedure was repeated 5 times with the neck scale filled approximately to zero each time. The repeatability of the 5 measurements was 17 parts in 10^6 and the expanded uncertainty in the measured volume is ±0.010%. It was calculated according to References [1] and [2] with a 95 % confidence level† and is traceable to NIST mass, temperature, pressure, and humidity standards, and a NIST water density determination.

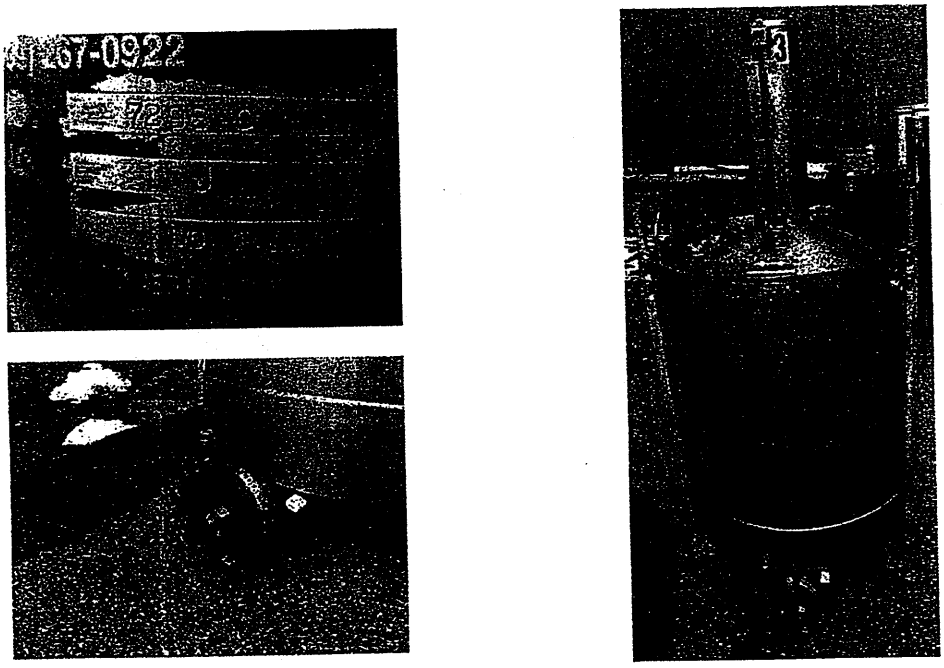

Figure 1. Photographs of the volume prover.

The input data used for calculation of the prover volume are given in the spreadsheet attached to this report. The calibration and uncertainties presented here are only valid over the range of the

[2] Taylor, B. N. and Kuyatt, C. E., "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Results," NIST Technical Note 1297, National Institute of Standards and Technology (January 1993).

† Coverage factor of 1.97 for 339 effective degrees of freedom.

NIST calibration of this test measure. When the test measure is applied by the customer to measure liquid volume, uncertainties beyond the NIST calibration must be considered, for example: leveling of the test measure, reading the meniscus, cleanliness of the test measure interior, drainage effects due to liquid viscosity, etc.

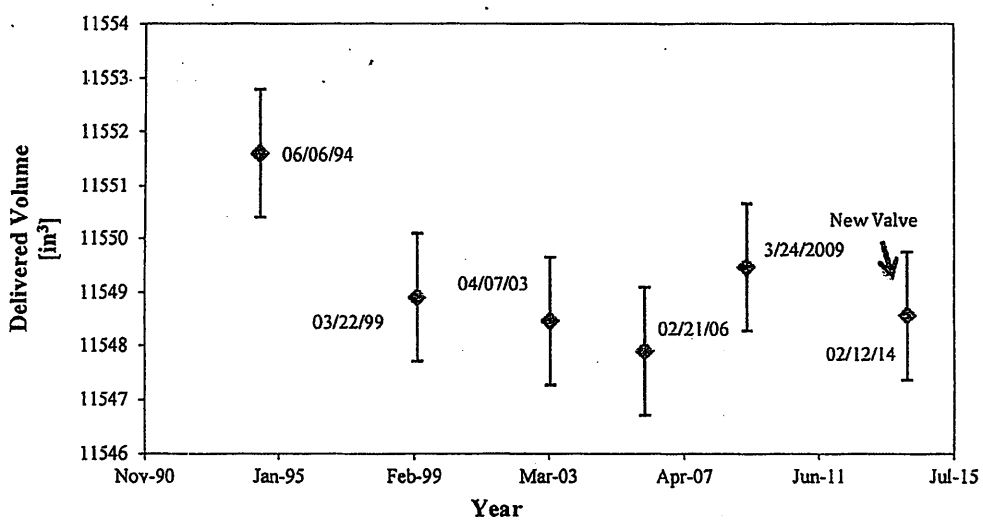

Figure 2. Calibration control chart for 50 gallon graduated neck test measure SN 7293-C

Table 2. Results of prior calibrations for the delivered volume.

Date	*Delivered Volume [in³]*	*Difference from Prior [in³]*	*Degree of Equivalence [-]*
02/12/14	11548.56	-0.91	-0.26
03/24/09	11549.47	1.57	0.18
02/21/06	11547.90	-0.56	-0.24
04/07/03	11548.46	-0.44	0.27
03/22/99	11548.90	-2.70	-0.67
06/06/94	11551.60	0.00	0.00

For the Director,
National Institute of Standards and Technology

Dr. John D. Wright
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Johnson Gage and Inspection, Inc.

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ACCREDITED
Calibration Lab
Cert #2820.01

Certificate of Calibration

Report Number: 210144A | Page 1 of 1 | Form 2511

Customer: METER ENGINEERS, INC. | REV C 12-01-11

7718 W. 53rd ST. NORTH
MAIZE KS 67101

Item: MERCURY THERMOMETER
Unit Number: 4P6153
Model Number: MILLER & WEBER SAMA FP40 T-3426
Serial Number: 4P6153
Location: PRODUCTION

Inspector: KF
Date Calibrated: Jan 6, 2017
Recalibration Date: Jan 6, 2018
Temperature: 72 °F
Relative Humidity: 16 %

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Item Range: 30°F to 124°F
Resolution: 0.05°F
Tolerance: ±0.10°F
Class: N/A
Controlling Specification(s): ISO/IEC 17025, ANSI/NCSL Z540-1
Calibration/Inspection Procedure(s): WP4001
Tolerance Source: C See Below

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Standard Value	Test Result	Deviation	Uncertainty @k=2
32.00°F	32.00°F	NONE	0.1°F
76.00°F	75.90°F	-0.10°F	0.09°F
120.00°F	120.10°F	+0.10°F	0.09°F

The reported expanded uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor k such that the coverage probability corresponds to approximately 95%. This estimate was performed in accordance with guidelines set forth in ANSI/NCSL Z540-2. The acceptance or rejection of the item(s) is based on the actual test values shown, without adjustment for measurement uncertainty. All testing performed using standards traceable to NIST or to intrinsic standards. This document shall not be reproduced except in full, without the written permission of Johnson Gage and Inspection. Tolerance source key: C = Customer; S = Specification; M = Manufacturer; R = JGI Recommended.

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Comments: FOUND IN TOLERANCE. NO ADJUSTMENT REQUIRED.

Additional Standard Used: FLUKE 1502A S/N: B55852 CERTIFIED 5-9-16 DUE 5-9-17 T/N: 200759

Condition: USED

RESULTS: ACCEPTED

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CALIBRATION STANDARD

Manufacturer/type: BURNS ENGINEERING PRT
Model Number: 3925
Date Certified: Nov 9, 2015
Serial Number: 496142
Date Due: Nov 9, 2017
TRACEABILITY NUMBER: Y229241

Approved by:

William C. Meiners Jr. SC

1/6/2017

Johnson Gage and Inspection, Inc.

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Certificate of Calibration

Report Number: 210477A

Form 2511
REV C 12-01-11

Customer: METER ENGINEERS, INC.

7718 W. 53rd ST. NORTH
MAIZE KS 67101

Item: DIGITAL THERMOMETER
Unit Number: 1630273
Model Number: MARTEL BETA PROBE T1
Serial Number: 1630273
Location: PRODUCTION

Inspector: KF
Date Calibrated: Jan 12, 2017
Recalibration Date: Jul 12, 2017
Temperature: 73 °F
Relative Humidity: 16 %

****

Item Range: -58 °F to 320 °F
Tolerance: ±0.1 °F
Resolution: 0.01 °F
Class: N/A
Controlling Specification(s): ISO/IEC 17025, ANSI/NCSL Z540-1
Calibration/Inspection Procedure(s): WP4001
Tolerance Source: M See Below

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Standard Value	Test Result	Deviation	Uncertainty @k=2
32.00 °F	31.96 °F	-0.04 °F	0.1 °F
120.00 °F	119.91 °F	-0.09 °F	0.09 °F
200.00 °F	199.93 °F	-0.07 °F	0.09 °F

The reported expanded uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor k such that the coverage probability corresponds to approximately 95%. This estimate was performed in accordance with guidelines set forth in ANSI/NCSL Z540-2. The acceptance or rejection of the item(s) is based on the actual test values shown, without adjustment for measurement uncertainty. All testing performed using standards traceable to NIST or to intrinsic standards. This document shall not be reproduced except in full, without the written permission of Johnson Gage and Inspection. Tolerance source key: C = Customer; S = Specification; M = Manufacturer; R = JGI Recommended.

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Comments: FOUND IN TOLERANCE. NO ADJUSTMENT REQUIRED. RESOLUTION SET BY CUSTOMER.

Additional Standards Used: FLUKE 1502A S/N B55852, CERT 5-9-16, DUE 5-9-17, T/N 200759

Note: TEST POINTS PER CUSTOMER REQUEST.

Condition: USED

RESULTS: ACCEPTED AS NOTED

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CALIBRATION STANDARD

Manufacturer/type: BURNS ENGINEERING PRT
Model Number: 3925
Date Certified: Nov 9, 2015
Serial Number: 496142
Date Due: Nov 9, 2017
TRACEABILITY NUMBER: Y229241

Approved by:

William C. Mimms, Jr. SC

1/12/2017

Unit 134

ARROW LABORATORY, INC.

Metallurgical Analysis and Testing

PO BOX 248
WICHITA KS 67201-0248
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METER ENGINEERS
7718 W 53rd St NORTH
MAIZE KS 67101

01-11-17

LABORATORY REPORT #d90ra110

PRESSURE GAGE CALIBRATION

One 4.5 inch liquid filled WIKA XSEL pressure gage, S/N 586, 0-60 psi capacity with 0.5 psi subdivisions, was received in usable condition and calibrated as shown below. The gage was checked with our Ashcroft dead weight gage tester. Testing was performed in accordance with ASME B40.100-2013, ISO 10012-2003, and ANSI/NCSL Z540.3-2006.
Calibration Data:

LOAD psi	Average GAGE READING as Left
0	0.0 psi
15	14.7
25	24.5
35	34.5
45	44.5
60	59.8

Maximum Error center 1/2 of scale: 1.0% of span
Max Error upper and lower 1/4 of scale: 0.9% of span
Accuracy: +/- 1.0% of span
Adjustments: none Limitations of use: none
Calibrated: 1-9-17 Temperature: 71°F
Client Provided Confirmation Interval: annual

These results meet ASME B40.100 grade 1A accuracy requirements.

Ashcroft Gage Tester: S/N DWT 11436, Uncertainty: +/- 0.07%
Weights: Tester weights were compared with weights calibrated on NIST Traceable Test #OBS 14-0422 Cal Due: 5-31-17
Piston Assembly:
The piston diameter and cylinder bore were measured by Precision Metrology Test# 1001883919 and certified to +/- 0.10% using masters traceable to NIST. Cal Due: 7-05-18

Project Supervisor

Dale Roark

Dale E. Roark

Rec'd 12-27-16
DER/dr