

Calibration Certificate of Mass

Calibration Date: April 7, 2019

Certificate Number: 2019-039-1

Submitted By: FSCP Area 55
3721 West Cuming St.
Lincoln, NE 68524

Point of Contact: Chris Uglow
Ph. 402-471-3422
email: chris.uglow@nebraska.gov
PO Number:

Test Item(s): (66) Cast Iron Weights	Artifact(s) Description:	Date Received: March 1, 2019
Serial Number(s): See next page		ID / Asset Number: N/A
Manufacture: Rice Lake		Class Specification: NIST Class F
Condition: Fair (significant wear)		Material: Cast Iron

Reference Standards Used: NSL lb standards	Procedure Used: NIST HB 6969, SOP 8 Metrologist: JPL	Equipment Used: Mettler KA30-3 Mettler XP 604
--	---	--

Environmental Cond. **Temp:** 20.5 °C **Pressure:** 772.922 mmHg **Relative Humidity:** 46.68 %

Pertinent Information

- The artifact(s) listed in this document have been found and/or left within the maximum permissible error for the specification stated above, except as noted. An artifact is considered in-compliance when the correction plus the measurement uncertainty is equal to or less than the maximum permissible error. **RED** print indicates an out-of-compliance reading.
- All corrections stated in this report correlate to a "Conventional Mass" (CM), also known as "apparent mass", scale verses 8.0 g/cm³ reference mass density and an air density of 1.2 mg/cm³ at 20 °C.

Traceability Statement

The artifact(s) described in this certificate have been compared to the Standards of the State of Nebraska. The Standards of the State of Nebraska are traceable to the International System of Units (SI) through the National Institute of Standards and Technology (NIST) and are part of a comprehensive measurement assurance program for ensuring continued accuracy and measurement traceability within the level of uncertainty reported by this laboratory. The calibration number for this certificate is the only unique calibration number to be used in referencing measurement traceability for the artifact(s) described in this certificate.

Uncertainty Statement

The combined standard uncertainty includes uncertainties reported for the standard, uncertainties associated with the measurement process, uncertainties for any observed deviations from reference values which are less than surveillance limits and the standard uncertainty for any uncorrected errors associated with air buoyance corrections. The combined standard uncertainty is multiplied by a coverage factor (*k*), to give the expanded uncertainty, which defines an interval with a 95.45 percent level of confidence. The expanded uncertainty presented in this report is consistent with the *Guide to the Expression of Uncertainty in Measurement (2008, revised 2012)*. Some components of the calibration can be evaluated through a Type A evaluation, or the method of evaluation of uncertainty by the statistical analysis (standard deviation) from the observations taken. Magnetic testing has not been performed, therefore, there are no components for the effects of it in the uncertainty budget.

Calibration Date: April 7, 2019

Certificate Number: 2019-039-1

Calibration Results

Nominal Mass	Serial Number / ID	As Found Conventional Mass Correction (g)	Adjusted (Y/N)	As Left Conventional Mass Correction (g)	Uncertainty ± (g)	(k) factor	NIST Class F MPE ± (g)	Assumed Density (g/cm ³)
15 lb	WM15-19	0.546	N	0.546	0.082	2	0.68	7.2
15 lb	WM15-20	0.746	Y	0.211	0.082	2	0.68	7.2
25 lb	D31	1.60	Y	0.09	0.14	2	1.1	7.2
25 lb	D34	1.47	Y	0.53	0.14	2	1.1	7.2
25 lb	D40	0.34	N	0.34	0.14	2	1.1	7.2
25 lb	D41	4.95	Y	0.44	0.14	2	1.1	7.2
25 lb	D43	2.59	Y	-0.14	0.14	2	1.1	7.2
25 lb	D44	1.63	Y	0.46	0.14	2	1.1	7.2
25 lb	D-46	1.51	Y	-0.06	0.14	2	1.1	7.2
25 lb	NE-23	0.05	N	0.05	0.14	2	1.1	7.2
25 lb	NE-27	0.55	N	0.55	0.14	2	1.1	7.2
25 lb	NE-28	0.18	N	0.18	0.14	2	1.1	7.2
25 lb	NE-38	1.50	Y	-0.29	0.14	2	1.1	7.2
25 lb	NE-39	2.85	Y	0.50	0.14	2	1.1	7.2
25 lb	WM25-21	0.14	N	0.14	0.14	2	1.1	7.2
25 lb	WM25-23	0.97	Y	0.33	0.14	2	1.1	7.2
25 lb	WM25-30	1.60	Y	0.42	0.14	2	1.1	7.2
25 lb	WM25-99	2.11	Y	0.44	0.14	2	1.1	7.2
25 lb	WM-D17	-0.08	N	-0.08	0.14	2	1.1	7.2
25 lb	WM-D27	0.39	N	0.39	0.14	2	1.1	7.2
25 lb	WM-D31	0.28	N	0.28	0.14	2	1.1	7.2
25 lb	WM-D32	6.18	Y	0.02	0.14	2	1.1	7.2
25 lb	WM-D33	1.41	Y	0.16	0.14	2	1.1	7.2
25 lb	WM-D34	1.19	Y	0.23	0.14	2	1.1	7.2
25 lb	WM-D35	1.16	Y	-0.09	0.14	2	1.1	7.2
25 lb	WM-D36	0.90	N	0.90	0.14	2	1.1	7.2
25 lb	WM-D37	0.81	N	0.81	0.14	2	1.1	7.2
25 lb	WM-D38	1.20	Y	-0.07	0.14	2	1.1	7.2
25 lb	WM-D39	0.68	N	0.68	0.14	2	1.1	7.2
25 lb	WM-D40	0.38	N	0.38	0.14	2	1.1	7.2
25 lb	WM-D41	1.25	Y	-0.46	0.14	2	1.1	7.2
25 lb	WM-D42	0.36	N	0.36	0.14	2	1.1	7.2
25 lb	WM-D43	1.47	Y	0.32	0.14	2	1.1	7.2
25 lb	WM-D45	0.07	N	0.07	0.14	2	1.1	7.2
25 lb	WM-D47	-0.04	N	-0.04	0.14	2	1.1	7.2
25 lb	WM-D48	0.98	Y	0.01	0.14	2	1.1	7.2
25 lb	WM-D49	0.75	N	0.75	0.14	2	1.1	7.2
25 lb	WM-D50	1.50	Y	0.71	0.14	2	1.1	7.2
50 lb	OPI-C61	0.67	N	0.67	0.28	2	2.3	7.2
50 lb	OPI-C64	1.83	N	1.83	0.28	2	2.3	7.2
50 lb	OPI-C65	2.04	Y	0.00	0.28	2	2.3	7.2
50 lb	OPI-C71	0.94	N	0.94	0.28	2	2.3	7.2
50 lb	OPI-C84	1.30	N	1.30	0.28	2	2.3	7.2
50 lb	WMOPI-C74	2.15	Y	-0.01	0.28	2	2.3	7.2
1000 lb	B2	13.1	N	13.1	6	2.008	45	7.2
1000 lb	B3	5.1	N	5.1	6	2.008	45	7.2
1000 lb	B4	0.5	N	0.5	6	2.008	45	7.2
1000 lb	B5	9.7	N	9.7	6	2.008	45	7.2
1000 lb	B6	14.5	N	14.5	6	2.008	45	7.2
1000 lb	B7	8.8	N	8.8	6	2.008	45	7.2
1000 lb	B8	11.1	N	11.1	6	2.008	45	7.2
1000 lb	B9	-17.5	N	-17.5	6	2.008	45	7.2
1000 lb	B10	4.3	N	4.3	6	2.008	45	7.2
1000 lb	B12	1.3	N	1.3	6	2.008	45	7.2

Calibration Date: April 7, 2019

Certificate Number: 2019-039-1

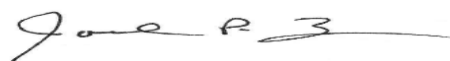
Calibration Results

Nominal Mass	Serial Number / ID	As Found Conventional Mass Correction (g)	Adjusted (Y/N)	As Left Conventional Mass Correction (g)	Uncertainty ± (g)	(k) factor	NIST Class F MPE ± (g)	Assumed Density (g/cm ³)
1000 lb	B13	-31.4	N	-31.4	6	2.008	45	7.2
1000 lb	B14	10.1	N	10.1	6	2.008	45	7.2
1000 lb	B17	-16.4	N	-16.4	6	2.008	45	7.2
1000 lb	B-18	18.7	N	18.7	6	2.008	45	7.2
1000 lb	B19	13.5	N	13.5	6	2.008	45	7.2
1000 lb	B20	-2.1	N	-2.1	6	2.008	45	7.2
1000 lb	B21	-12.0	N	-12.0	6	2.008	45	7.2
1000 lb	B23	6.7	N	6.7	6	2.008	45	7.2

Conversion Factors

1 ounce (avoirdupois) (oz) = 28.349 52 g

1 pound (avoirdupois) (lb) = 453.592 37 g exactly



Joel P. Lavicky Metrologist

4/7/2019

Date of Issue

The results in this certificate only applies to those item specifically listed in this certificate. This certificate cannot be considered complete unless it contains all pages. This document may not be reproduced except in full, without the written consent of the Nebraska Standards Laboratory.

Calibration Date: 4/2/2019

**Certificate of Calibration
of Volume Transfer**

Certificate Number: 2019-039-2

Items Submitted:

Quantity	Nominal Volume	Manufacturer	Type
3	5 gal	SMI	"Special" J Prover

Submitted By: FSCP Area 55
3721 West Cuming St.
Lincoln, NE 68524

POC: Chris Uglov
402-471-3422
chris.uglov@nebraska.gov

Test Results

Nominal Volume	Serial Number	Material	Cubical Coefficient of Expansion (/°F)	As Found Volume Delivered @ 60 °F	As left Volume Delivered @ 60 °F	Uncertainty (U)	(k)
5 gal	144	SS	0.0000265	4.99821 gal	4.99821 gal	0.00061 gal	2.03
5 gal	145	SS	0.0000265	4.9986 gal	4.9986 gal	0.00061 gal	2.03
5 gal	146	SS	0.0000265	4.99987 gal	4.99987 gal	0.00061 gal	2.03

The data in this report only applies to those items specifically listed on this report.

Volume delivered at 60°F after a 30 second pour and 10 second drain for test measures. For provers and a 30 second drain time would apply.

Conversion Factors:

1 gal = 231 in³
1 gal = 3.785 412 E-03 m³

Traceability Statement:

The artifact(s) described in this report have been compared to the Standards of the State of Nebraska. The Standards of the State of Nebraska are traceable to the International System of Units (SI) through the National Institute of Standards and Technology (NIST) and are part of a comprehensive measurement assurance program for ensuring continued accuracy and measurement traceability within the level of uncertainty reported by this laboratory. The calibration number for this report is the only unique calibration number to be used in referencing measurement traceability for the artifact(s) described in this report.

Uncertainty Statement:

The combined standard uncertainty includes uncertainties reported for the standard, uncertainties associated with the measurement process, uncertainties for any observed deviations from reference values which are less than surveillance limits and the standard uncertainty for any uncorrected errors. The combined standard uncertainty is multiplied by a coverage factor (*k*), to give the expanded uncertainty, which defines an interval with a 95.45 percent level of confidence. The expanded uncertainty presented in this report is consistent with the Guide to the Expression of Uncertainty in Measurement (2008, revised 2012). Some components of the calibration can be evaluated through a Type A evaluation, or the method of evaluation of uncertainty by the statistical analysis (standard deviation) from the observations taken.

Pertinent Information:

The artifact(s) listed above have been found and/or left within the maximum permissible error for the specification stated above, except as noted. An artifact is considered in-compliance when the correction plus the measurement uncertainty is equal to or less than the maximum permissible error.

Condition of Item(s) Submitted for Calibration:

Good

Laboratory Reference Standard Used:

5 gal SP NE 1586

Treatment of Item(s) before Calibration:

Tested as Found

Procedure Used:

NISTIR 7383, SOP 19

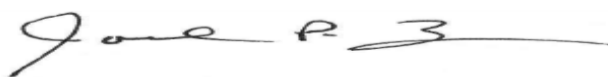
Environmental conditions at time of calibration:

Temp °C	19.6	Humidity %	47.3
Pressure mmHg	766.57		

Water temperature at time of calibration:

45.88 °F

Date Submitted: 3/24/2019



Joel P. Lavicky, Metrologist

4/2/2019

Date:

This document does not represent or imply endorsement by the State of Nebraska, The Nebraska Standards Laboratory or NIST. This document may not be reproduced, except in full, without the written permission of the Nebraska Standards Laboratory

Calibration Date: 2/25/2019

**Certificate of Calibration
of Volume Transfer**

Certificate Number: 2019-039-3

Items Submitted:

Quantity	Nominal Volume	Manufacturer	Type
2	5 gal	Seraphin	Test Measure 4" Neck

Submitted By: FSCP Area 55

3721 West Cuming St.
Lincoln, NE 68524

POC: Chris Uglow

402-471-3422

chris.uglow@nebraska.gov

Test Results

Nominal Volume	Serial Number	Material	Cubical Coefficient of Expansion (°F)	As Found Volume Delivered @ 60 °F	As left Volume Delivered @ 60 °F	Uncertainty (U)	(k)
5 gal	4393-5-D	SS	0.0000265	5.00181 gal	5.00181 gal	0.00100 gal	2.05
5 gal	4393-5-A	SS	0.0000265	5.00071 gal	5.00071 gal	0.00100 gal	2.05

The data in this report only applies to those items specifically listed on this report.

Volume delivered at 60°F after a 30 second pour and 10 second drain for test measures. For provers and a 30 second drain time would apply.

Conversion Factors:

1 gal = 231 in³

1 gal = 3.785 412 E-03 m³

Traceability Statement:

The artifact(s) described in this report have been compared to the Standards of the State of Nebraska. The Standards of the State of Nebraska are traceable to the International System of Units (SI) through the National Institute of Standards and Technology (NIST) and are part of a comprehensive measurement assurance program for ensuring continued accuracy and measurement traceability within the level of uncertainty reported by this laboratory. The calibration number for this report is the only unique calibration number to be used in referencing measurement traceability for the artifact(s) described in this report.

Uncertainty Statement:

The combined standard uncertainty includes uncertainties reported for the standard, uncertainties associated with the measurement process, uncertainties for any observed deviations from reference values which are less than surveillance limits and the standard uncertainty for any uncorrected errors. The combined standard uncertainty is multiplied by a coverage factor (*k*), to give the expanded uncertainty, which defines an interval with a 95.45 percent level of confidence. The expanded uncertainty presented in this report is consistent with the Guide to the Expression of Uncertainty in Measurement (2008, revised 2012). Some components of the calibration can be evaluated through a Type A evaluation, or the method of evaluation of uncertainty by the statistical analysis (standard deviation) from the observations taken.

Pertinent Information:

The artifact(s) listed above have been found and/or left within the maximum permissible error for the specification stated above, except as noted. An artifact is considered in-compliance when the correction plus the measurement uncertainty is equal to or less than the maximum permissible error.

Condition of Item(s) Submitted for Calibration:

Good

Laboratory Reference Standard Used:

5 gal SP NE 1586

Treatment of Item(s) before Calibration:

Tested as Found

Procedure Used:

NISTIR 7383, SOP 19

Environmental conditions at time of calibration:

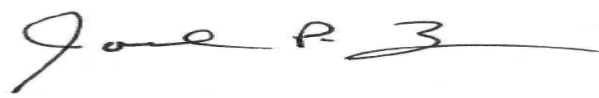
Temp °C	20.5	Humidity %	48.7
Pressure mmHg	761.09		

Water temperature at time of calibration:

44.22 °F

Date Submitted:

2/21/2019



Joel P. Lavicky, Metrologist

3/28/2019

Date:

This document does not represent or imply endorsement by the State of Nebraska, The Nebraska Standards Laboratory or NIST. This document may not be reproduced, except in full, without the written permission of the Nebraska Standards Laboratory