

## Calibration Certificate of Mass

**Calibration Date:** August 31, 2020

**Certificate Number:** 2020-092-1

**Submitted By:** FSCP Area 90  
3721 West Cuming St.  
Lincoln, NE 68524

**Point of Contact:** Standards Lab  
Ph. 402-471-3422

**email:** 0

**PO Number:** N/A

**Test Item(s):** (2)-15 & (20)-25 lb weights  
**Serial Number(s):** See Next Page  
**Manufacture:** Rice Lake  
**Condition:** Good (some wear)

**Artifact(s) Description:**

**Date Received:** August 30, 2020  
**ID / Asset Number:** FSCP Area 90  
**Class Specification:** NIST Class F  
**Material:** Cast Iron

**Reference Standards Used:**

NSL lb standards

**Procedure Used:**

NIST HB 6969, SOP 8 (2018)

**Metrologist:**

JPL

**Equipment Used:**

Mettler XPR32003

**Environmental Cond.**

**Temp:** 22.9 °C    **Pressure:** 728.73 mmHg    **Relative Humidity:** 48.4 %

**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 of the tolerances and specifications were evaluated according to ASTM E617 (2018) and/or NIST HB 105-1 (2019).
- All corrections stated in this report correlate to a "Conventional Mass" (CM), also known as "apparent mass", scale verses 8.0 g/cm<sup>3</sup> reference mass density and an air density of 1.2 mg/cm<sup>3</sup> 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: August 31, 2020

Certificate Number: 2020-092-1

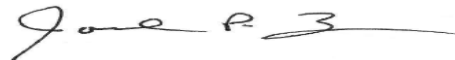
### Calibration Results

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 <sup>3</sup> )
15 lb	WM15-7	-0.971	Y	-0.071	0.081	2	0.68	7.2
15 lb	WM15-8	-0.401	N	-0.401	0.081	2	0.68	7.2
25 lb	NE-21	0.39	N	0.39	0.14	2	1.1	7.2
25 lb	NE-22	0.13	N	0.13	0.14	2	1.1	7.2
25 lb	NE-24	-0.11	N	-0.11	0.14	2	1.1	7.2
25 lb	NE-26	0.28	N	0.28	0.14	2	1.1	7.2
25 lb	OPI-D1	-0.10	N	-0.10	0.14	2	1.1	7.2
25 lb	WM-OPI-D3	-0.16	N	-0.16	0.14	2	1.1	7.2
25 lb	WM25-46	-0.64	N	-0.64	0.14	2	1.1	7.2
25 lb	WM25-47	-0.56	N	-0.56	0.14	2	1.1	7.2
25 lb	WM-D3	-1.22	Y	-0.40	0.14	2	1.1	7.2
25 lb	WM-D4	-0.91	Y	0.06	0.14	2	1.1	7.2
25 lb	WM-D5	-0.65	N	-0.65	0.14	2	1.1	7.2
25 lb	WM-D6	-1.02	Y	0.00	0.14	2	1.1	7.2
25 lb	WM-D7	-1.37	Y	-0.39	0.14	2	1.1	7.2
25 lb	WM-D8	-0.75	N	-0.75	0.14	2	1.1	7.2
25 lb	WM-D9	-0.39	N	-0.39	0.14	2	1.1	7.2
25 lb	WM-D10	-0.80	N	-0.80	0.14	2	1.1	7.2
25 lb	WM-D11	-0.89	Y	0.09	0.14	2	1.1	7.2
25 lb	WM-D12	-0.70	N	-0.70	0.14	2	1.1	7.2
25 lb	WM-D21	-1.38	Y	-0.38	0.14	2	1.1	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**

9/18/2020

**Date of Issue**

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## Calibration Certificate of Mass

**Calibration Date:** September 1, 2020

**Certificate Number:** 2020-092-2

**Submitted By:** FSCP Area 90  
3721 West Cuming St.  
Lincoln, NE 68524

**Point of Contact:** Standards Lab  
Ph. 402-471-3422  
**email:** 0  
**PO Number:** N/A

**Test Item(s):** lb weight kit  
**Serial Number(s):** 10-OPI-9  
**Manufacture:** Troemner  
**Condition:** Good (some wear)

**Artifact(s) Description:**

**Date Received:** August 30, 2020  
**ID / Asset Number:** FSCP Area 90  
**Class Specification:** NIST Class F  
**Material:** SS & AL

**Reference Standards Used:**

NSL lb standards

**Procedure Used:**

NIST HB 6969, SOP 8 (2018)

**Metrologist:**

JPL

**Equipment Used:**

Sartorius CC 1201 Sartorius CCE6  
Mettler AT 106

**Environmental Cond.**    **Temp:** 22 °C    **Pressure:** 726.8 mmHg    **Relative Humidity:** 45.3 %

**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 of the tolerances and specifications were evaluated according to ASTM E617 (2018) and NIST HB 105-1 (2019).
- All corrections stated in this report correlate to a "Conventional Mass" (CM), also known as "apparent mass", scale versus 8.0 g/cm<sup>3</sup> reference mass density and an air density of 1.2 mg/cm<sup>3</sup> 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: September 1, 2020

Certificate Number: 2020-092-2

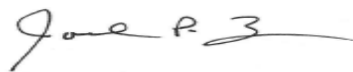
### Calibration Results

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 <sup>3</sup> )
2 lb	1	-0.029	n	-0.029	0.011	2	0.091	7.84
2 lb	2	-0.021	n	-0.021	0.011	2	0.091	7.84
2 lb	3	-0.013	n	-0.013	0.011	2	0.091	7.84
2 lb	4	-0.015	n	-0.015	0.011	2	0.091	7.84
2 lb	5	0.004	n	0.004	0.011	2	0.091	7.84
2 lb	6	-0.004	n	-0.004	0.011	2	0.091	7.84
2 lb	7	0.016	n	0.016	0.011	2	0.091	7.84
2 lb	8	0.019	n	0.019	0.011	2	0.091	7.84
2 lb	9	-0.059	n	-0.059	0.011	2	0.091	7.84
2 lb	10	-0.002	n	-0.002	0.011	2	0.091	7.84
2 lb	11	0.032	n	0.032	0.011	2	0.091	7.84
2 lb	12	-0.021	n	-0.021	0.011	2	0.091	7.84
2 lb	13	0.028	n	0.028	0.011	2	0.091	7.84
2 lb	14	-0.002	n	-0.002	0.011	2	0.091	7.84
1 lb	15	-0.0109	n	-0.0109	0.0083	2	0.07	7.84
1 lb	16	-0.0170	n	-0.0170	0.0083	2	0.07	7.84
0.3 lb		0.0007	n	0.0007	0.0032	2	0.027	7.84
0.2 lb		0.0041	n	0.0041	0.0022	2	0.018	7.84
0.1 lb		0.0031	n	0.0031	0.0011	2	0.0091	7.84
0.05 lb		0.00131	n	0.00131	0.00054	2	0.0045	7.84
0.03 lb		0.00059	n	0.00059	0.00032	2	0.0027	7.84
0.02 lb		0.00052	n	0.00052	0.00022	2	0.0018	7.84
0.01 lb		0.00031	n	0.00031	0.00018	2	0.0015	7.84
0.005 lb		0.00082	n	0.00082	0.00014	2	0.0012	2.7
0.003 lb		0.00061	n	0.00061	0.00012	2	0.00099	2.7
0.002 lb		0.00068	n	0.00068	0.00011	2	0.00087	2.7
0.001 lb		0.000190	n	0.000190	0.000083	2	0.0007	2.7
0.001 lb	*	0.000202	n	0.000202	0.000083	2	0.0007	2.7
8 oz		-0.0200	n	-0.0200	0.0054	2	0.045	7.84
4 oz		0.0083	n	0.0083	0.0028	2	0.023	7.84
2 oz		0.0052	n	0.0052	0.0013	2	0.011	7.84
1 oz		-0.00397	n	-0.00397	0.00064	2	0.0054	7.84
1/2 oz		0.00125	n	0.00125	0.00034	2	0.0028	7.84
1/4 oz		0.00061	n	0.00061	0.00021	2	0.0017	7.84
1/8 oz		-0.00025	n	-0.00025	0.00016	2	0.0013	7.84
1/16 oz		0.00078	n	0.00078	0.00013	2	0.0011	7.84
1/16 oz	*	-0.00043	n	-0.00043	0.00013	2	0.0011	7.84

#### Conversion Factors

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

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



Joel P. Lavicky Metrologist

9/18/2020

Date of Issue

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Calibration Date: 9/3/2020

**Certificate of Calibration  
of Volume Transfer**

Certificate Number: 2020-092-3

**Items Submitted:**

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

**Submitted By:** FSCP Area 90  
3721 West Cuming St.  
Lincoln, NE 68524

**POC:** Standards Lab  
402-471-3422  
0

**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	40702-A	SS	0.0000265	<b>5.0007 gal</b>	<b>5.0007 gal</b>	0.0013 gal	2.08
5 gal	40702-B	SS	0.0000265	<b>4.9996 gal</b>	<b>4.9996 gal</b>	0.0013 gal	2.08

*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 a 30 second drain time would apply.

**Conversion Factors:**

1 gal = 231 in<sup>3</sup>  
1 gal = 3.785 412 E-03 m<sup>3</sup>

**Traceability Statement:**

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**Uncertainty Statement:**

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**Pertinent Information:**

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**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 (2016)

**Environmental conditions at time of calibration:**

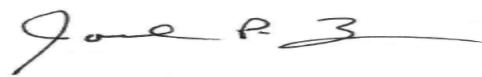
Temp °C	23.1	Humidity %	40.9
Pressure mmHg	731.77		

**Water temperature at time of calibration:**

71.20 °F

**Date Submitted:**

9/3/2020



Joel P. Lavicky, Metrologist

9/14/2020

Issue Date:

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Calibration Date: 9/17/2020

**Certificate of Calibration  
of Volume Transfer**

Certificate Number: 2020-092-4

**Items Submitted:**

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

Submitted By: FSCP Area 90  
3721 West Cuming St.  
Lincoln, NE 68524

POC: Standards Lab  
402-471-3422  
0

**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	05-40547-04	SS	0.0000265	5.00074 gal	5.00074 gal	0.00100 gal	2.04
5 gal	05-40547-05	SS	0.0000265	4.99878 gal	4.99878 gal	0.00100 gal	2.04
5 gal	05-40547-06	SS	0.0000265	4.99875 gal	4.99875 gal	0.00100 gal	2.04

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 a 30 second drain time would apply.

**Conversion Factors:**

1 gal = 231 in<sup>3</sup>  
1 gal = 3.785 412 E-03 m<sup>3</sup>

**Traceability Statement:**

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**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 (2016)

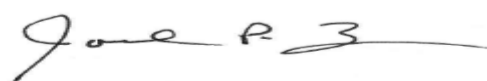
**Environmental conditions at time of calibration:**

Temp °C	21.5	Humidity %	53.2
Pressure mmHg	734.82		

**Water temperature at time of calibration:**

68.83 °F

Date Submitted: 9/3/2020



Joel P. Lavicky, Metrologist

9/18/2020

Issue Date:

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