

## Calibration Certificate of Mass

**Calibration Date:** October 16, 2018

**Certificate Number:** 2018-088-1

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

**Point of Contact:** Brian Heskin  
Ph. 402-471-3422  
**email:** [brian.heskin@nebraska.gov](mailto:brian.heskin@nebraska.gov)  
**PO Number:** N/A

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

**Artifact(s) Description:**

**Date Received:** October 12, 2018  
**ID / Asset Number:** N/A  
**Class Specification:** NIST Class F  
**Material:** Cast Iron

**Reference Standards Used:**

NSL lb standards

**Procedure Used:**

NIST HB 6969, SOP 8

**Metrologist:**

JPL

**Equipment Used:**

Mettler KA30-3

**Environmental Cond.**    **Temp:** 21.4 °C    **Pressure:** 765.048 mmHg    **Relative Humidity:** 48.7 %

**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/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.

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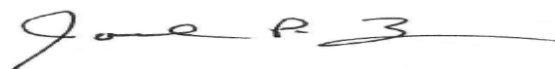
### Calibration Results

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	2.786	y	0.231	0.082	2	0.68	7.2
15 lb	WM15-8	2.076	y	0.161	0.082	2	0.68	7.2
25 lb	WM-D3	2.51	y	0.50	0.14	2	1.1	7.2
25 lb	WM-D4	3.27	y	0.18	0.14	2	1.1	7.2
25 lb	WM-D5	3.15	y	0.94	0.14	2	1.1	7.2
25 lb	WM-D6	2.96	y	0.49	0.14	2	1.1	7.2
25 lb	WM-D7	2.62	y	0.31	0.14	2	1.1	7.2
25 lb	WM-D8	3.73	y	0.45	0.14	2	1.1	7.2
25 lb	WM-D9	2.52	y	0.81	0.14	2	1.1	7.2
25 lb	WM-D10	2.31	y	0.53	0.14	2	1.1	7.2
25 lb	WM-D11	3.74	y	0.30	0.14	2	1.1	7.2
25 lb	WM-D12	2.26	y	0.71	0.14	2	1.1	7.2
25 lb	WM25-46	2.30	y	0.06	0.14	2	1.1	7.2
25 lb	WM25-47	2.34	y	0.59	0.14	2	1.1	7.2
25 lb	WM25-88	1.56	y	0.35	0.14	2	1.1	7.2
25 lb	WM25-89	2.53	y	0.88	0.14	2	1.1	7.2
25 lb	WM25-90	2.43	y	0.55	0.14	2	1.1	7.2
25 lb	WM25-91	2.34	y	0.80	0.14	2	1.1	7.2
25 lb	WM25-92	2.16	y	0.77	0.14	2	1.1	7.2
25 lb	WM25-93	3.27	y	0.94	0.14	2	1.1	7.2
25 lb	WM25-94	2.43	y	0.45	0.14	2	1.1	7.2
25 lb	WM25-95	2.72	y	0.32	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

10/18/2018

Date of Issue

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## Calibration Certificate of Mass

**Calibration Date:** October 17, 2018

**Certificate Number:** 2018-088-2

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

**Point of Contact:** Brian Heskin  
Ph. 402-471-3422  
**email:** [brian.heskin@nebraska.gov](mailto:brian.heskin@nebraska.gov)  
**PO Number:** N/A

**Test Item(s):** 31 lb Kit  
**Serial Number(s):** 10-OPI-9  
**Manufacture:** Tromner  
**Condition:** Good (some wear)

**Artifact(s) Description:**

**Date Received:** October 12, 2018

**ID / Asset Number:** N/A

**Class Specification:** NIST Class F

**Material:** SS & AL

**Reference Standards Used:**

NSL lb standards

**Procedure Used:**

NIST HB 6969, SOP 8

**Metrologist:**

JPL

**Equipment Used:**

Sartorius CC 1201 Sartorius CCE6

Mettler AT 106

**Environmental Cond.**    **Temp:** 20.9 °C    **Pressure:** 776.224 mmHg    **Relative Humidity:** 48 %

**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/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: **October 17, 2018**

Certificate Number: **2018-088-2**

**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	0.015	n	0.015	0.011	2	0.091	7.84
2 lb	8	0.018	n	0.018	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	0.020	n	0.020	0.011	2	0.091	7.84
2 lb	11	-0.015	n	-0.015	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	-0.001	n	-0.001	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	-0.0165	n	-0.0165	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		0.0042	n	0.0042	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		0.00130	n	0.00130	0.00054	2	0.0045	7.84
0.03 lb		0.00062	n	0.00062	0.00032	2	0.0027	7.84
0.02 lb		0.00054	n	0.00054	0.00022	2	0.0018	7.84
0.01 lb		0.00030	n	0.00030	0.00018	2	0.0015	7.84
0.005 lb		0.00080	n	0.00080	0.00014	2	0.0012	2.7
0.003 lb		0.00060	n	0.00060	0.00012	2	0.00099	2.7
0.002 lb		0.00067	n	0.00067	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	*	0.000203	n	0.000203	0.000083	2	0.0007	2.7
8 oz		-0.0201	n	-0.0201	0.0054	2	0.045	7.84
4 oz		0.0088	n	0.0088	0.0028	2	0.023	7.84
2 oz		0.0051	n	0.0051	0.0013	2	0.011	7.84
1 oz		-0.00413	n	-0.00413	0.00064	2	0.0054	7.84
1/2 oz		0.00122	n	0.00122	0.00034	2	0.0028	7.84
1/4 oz		0.00058	n	0.00058	0.00021	2	0.0017	7.84
1/8 oz		-0.00024	n	-0.00024	0.00016	2	0.0013	7.84
1/16 oz		0.00080	n	0.00080	0.00014	2	0.0011	7.84
1/16 oz	*	-0.00041	n	-0.00041	0.00014	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**

**10/18/2018**

**Date of Issue**

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## Calibration Certificate of Mass

**Calibration Date:** October 17, 2018

**Certificate Number:** 2018-088-3

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

**Point of Contact:** Brian Heskin  
Ph. 402-471-3422  
**email:** [brian.heskin@nebraska.gov](mailto:brian.heskin@nebraska.gov)  
**PO Number:** N/A

**Test Item(s):** 20 lb weight kit  
**Serial Number(s):** WM-6D98 / 17649  
**Manufacture:** Tromner  
**Condition:** Good (some wear)

**Artifact(s) Description:**

**Date Received:** October 12, 2018

**ID / Asset Number:** N/A

**Class Specification:** NIST Class F

**Material:** SS & AL

**Reference Standards Used:**

NSL lb standards

**Procedure Used:**

NIST HB 6969, SOP 8

**Metrologist:**

JPL

**Equipment Used:**

Sartorius CC10000S    Mettler AT 106

Sartorius CC 1201    Sartorius CCE6

**Environmental Cond.**    **Temp:** 20.9 °C    **Pressure:** 776.224 mmHg    **Relative Humidity:** 48 %

**Pertinent Information**

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- 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**

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**Uncertainty Statement**

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Calibration Date: October 17, 2018

Certificate Number: 2018-088-3

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> )
10 lb	1	0.172	n	0.172	0.054	2	0.45	7.84
5 lb	2	0.076	n	0.076	0.028	2	0.23	7.84
2 lb	3	-0.026	n	-0.026	0.011	2	0.091	7.84
2 lb	4	-0.017	n	-0.017	0.011	2	0.091	7.84
1 lb	5	0.0200	n	0.0200	0.0083	2	0.07	7.84
0.5 lb		0.0181	n	0.0181	0.0054	2	0.045	7.84
0.2 lb		0.0085	n	0.0085	0.0022	2	0.018	7.84
0.2 lb	*	0.0089	n	0.0089	0.0022	2	0.018	7.84
0.1 lb		0.0041	n	0.0041	0.0011	2	0.0091	7.84
0.05 lb		0.00176	n	0.00176	0.00054	2	0.0045	7.84
0.02 lb		0.00069	n	0.00069	0.00022	2	0.0018	7.84
0.02 lb	*	0.00035	n	0.00035	0.00022	2	0.0018	7.84
0.01 lb		0.00045	n	0.00045	0.00018	2	0.0015	7.84
0.005 lb		0.00017	n	0.00017	0.00014	2	0.0012	2.7
0.002 lb		0.00000	n	0.00000	0.00011	2	0.00087	2.7
0.002 lb	*	-0.00012	n	-0.00012	0.00011	2	0.00087	2.7
0.001 lb		0.000102	n	0.000102	0.000083	2	0.0007	2.7
8 oz	17	0.0106	n	0.0106	0.0054	2	0.045	7.84
4 oz	18	0.0013	n	0.0013	0.0028	2	0.023	7.84
2 oz		-0.0044	n	-0.0044	0.0013	2	0.011	7.84
1 oz		0.00218	n	0.00218	0.00064	2	0.0054	7.84
1/2 oz		-0.00050	n	-0.00050	0.00034	2	0.0028	7.84
1/4 oz		-0.00030	n	-0.00030	0.00021	2	0.0017	7.84
1/8 oz		-0.00052	n	-0.00052	0.00016	2	0.0013	7.84
1/16 oz		0.00002	n	0.00002	0.00014	2	0.0011	7.84
1/16 oz	*	-0.00051	n	-0.00051	0.00014	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

10/18/2018

Date of Issue

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Calibration Date: 10/15/2018

**Certificate of Calibration  
of Volume Transfer**

Certificate Number: 2018-088-4

**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:** Brian Heskin  
402-471-3422  
[brian.heskin@nebraska.gov](mailto:brian.heskin@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	05-40547-04	SS	0.0000265	4.99885 gal	4.99885 gal	0.00052 gal	2.04
5 gal	05-40547-05	SS	0.0000265	4.99862 gal	4.99862 gal	0.00052 gal	2.04
5 gal	05-40547-06	SS	0.0000265	4.99781 gal	4.99781 gal	0.00052 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 and 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:**

Minor wear

**Laboratory Reference Standard Used:**

5 gal SP NE 1586

**Treatment of Item(s) before Calibration:**

Item(s) were tested as found

**Procedure Used:**

NISTIR 7383, SOP 19

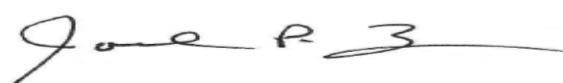
**Environmental conditions at time of calibration:**

Temp °C	21.7	Humidity %	42.4
Pressure mmHg	771.91		

**Water temperature at time of calibration:**

64.63 °F

**Date Submitted:** 10/12/2018



Joel P. Lavicky, Metrologist

10/18/2018

Date:

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Calibration Date: 10/15/2018

**Certificate of Calibration  
of Volume Transfer**

Certificate Number: 2018-088-5

**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:** Brian Heskin

402-471-3422

brian.heskin@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	40702 A	SS	0.0000265	<b>4.9997 gal</b>	<b>4.9997 gal</b>	0.0022 gal	2.08
5 gal	40702 B	SS	0.0000265	<b>4.9998 gal</b>	<b>4.9998 gal</b>	0.0022 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 and 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:**

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:**

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**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:**

Item(s) were tested as found

**Procedure Used:**

NISTIR 7383, SOP 19

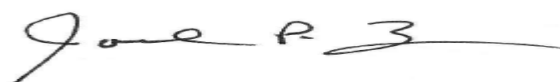
**Environmental conditions at time of calibration:**

Temp °C	21.7	Humidity %	42.4
Pressure mmHg	771.91		

**Water temperature at time of calibration:**

64.54 °F

**Date Submitted:** 10/12/2018



Joel P. Lavicky, Metrologist

10/18/2018

Date:

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