

Calibration Certificate of Mass

Calibration Date: August 14, 2024		Certificate Number: 2024-104-4	
Artifact(s) Owner: FSCP Area 30 3721 West Cuming St. Lincoln, NE 68524		Submitted by: State of Nebraska Point of Contact: NDA-Weights and Measures Ph. 402-471-3422 email: agr.wam@nebraska.gov	
Test Item(s): Precision metric weight kit	Artifact(s) Description:	Date Received: 8/5/2024	
Serial Number(s): WM-G89-2		ID / Asset Number: Area 30	
Condition: Excellent (little wear)		Class Specification: ASTM 4	
Material: Stainless Steel		Manufacture: Troemner	
Reference Standards Used:	Procedure Used:	Equipment Used:	
NSL & /Den Metric Volland-1707	NIST HB 6969, SOP 8 (2019)	Sartorius CC10000S	Sartorius CCE6
	Metrologist: JPL	Sartorius CC 1201	Mettler XPR 205
Environmental Cond.	Temp: 21.51 °C	Pressure: 729.49 mmHg	Relative Humidity: 49.98 %
<u>Pertinent Information</u>			
<ul style="list-style-type: none"> 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. It is the decision of the Laboratory to adjust the artifact(s) when the sum of the correction and the uncertainty exceed 95% of the maximum permissible error. All of the tolerances and design specifications (except density, hardness and magnetism) were evaluated according to ASTM E617 (2023) and/or NIST HB 105-1 (2019) for the artifacts designated class. 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. The Artifacts in "red" do not meet ASTM 4 tolerances but do meet ASTM 5 tolerances and should be evaluated before use. It is the end user's responsibility to verify that the weights meet the accuracy requirements outlined in NIST Handbook 44 (2020), Appendix A Fundamental Considerations, when using the weights for calibration of commercial (Legal for Trade) scales. 			
<u>Traceability Statement</u>			
<p>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.</p>			
<u>Uncertainty Statement</u>			
<p>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 (<i>k</i>), 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 <i>Guide to the Expression of Uncertainty in Measurement (2008, revised 2012)</i>. 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.</p>			

Calibration Date: August 14, 2024

Certificate Number: 2024-104-4

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	ASTM 4 MPE ± (g)	Assumed Density (g/cm ³)
4 kg	6	-0.009	n	-0.009	0.012	2	0.1	7.84
300 g		0.00281	n	0.00281	0.00085	2.002	0.006	7.84
200 g		0.00079	n	0.00079	0.00066	2.004	0.004	7.84
100 g		0.00150	n	0.00150	0.00025	2.003	0.002	7.84
50 g		0.00031	n	0.00031	0.00015	2.005	0.0012	7.84
30 g		0.00061	n	0.00061	0.00012	2.004	0.0009	7.84
20 g		0.000285	n	0.000285	0.000087	2.004	0.0007	7.84
10 g		0.000433	n	0.000433	0.000071	2.009	0.0005	7.84
5 g		0.000202	n	0.000202	0.000045	2.002	0.00036	7.84
3 g		0.000031	n	0.000031	0.000038	2.002	0.0003	7.84
2 g		0.000066	n	0.000066	0.000032	2.003	0.00026	7.84
1 g		0.000014	n	0.000014	0.000025	2.004	0.0002	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

8/20/2024

Date of Issue

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Calibration Certificate of Mass

Calibration Date: August 6, 2024

Certificate Number: 2024-104-1

Artifact(s) Owner: FSCP Area 30
3721 West Cuming St.
Lincoln, NE 68524

Submitted by: State of Nebraska
Point of Contact: NDA-Weights and Measures
Ph. 402-471-3422
email: agr.wam@nebraska.gov

Test Item(s): 22-cast weights
ID / Asset Number: Area -30
Manufacture: Rice Lake
Material: Cast Iron

Artifact(s) Description:

Date Received: August 5, 2024
Serial Number(s): See next page
Class Specification: NIST Class F
Condition: Good (some wear)

Reference Standards Used:

NSL lb standards

Procedure Used:

NIST HB 6969, SOP 8 (2019)

Equipment Used:

Mettler XPR32003

Metrologist:

JPL

Environmental Cond.

Temp: 23.9 °C **Pressure:** 733.9 mmHg **Relative Humidity:** 46.2 %

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/cm³ reference mass density and an air density of 1.2 mg/cm³ at 20 °C.
- It is the end user's responsibility to verify that the weights meet the accuracy requirements outlined in NIST Handbook 44 (2022), Appendix A Fundamental Considerations, when using the weights for calibration of commercial (Legal for Trade) scales.

Traceability Statement

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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 6, 2024

Certificate Number: 2024-104-1

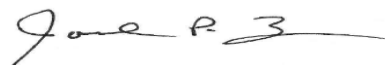
Calibration Results

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	WM15-1	0.175	N	0.175	0.085	2.01	0.68	7.2
15 lb	WM15-2	0.493	N	0.493	0.085	2.01	0.68	7.2
25 lb	NE-81	0.10	N	0.10	0.14	2.01	1.1	7.2
25 lb	NE-82	-0.05	N	-0.05	0.14	2.01	1.1	7.2
25 lb	NE-83	-0.07	N	-0.07	0.14	2.01	1.1	7.2
25 lb	NE-84	0.55	N	0.55	0.14	2.01	1.1	7.2
25 lb	NE-85	0.78	N	0.78	0.14	2.01	1.1	7.2
25 lb	NE-86	0.50	N	0.50	0.14	2.01	1.1	7.2
25 lb	NE-87	0.70	N	0.70	0.14	2.01	1.1	7.2
25 lb	NE-88	0.85	N	0.85	0.14	2.01	1.1	7.2
25 lb	NE-89	0.74	N	0.74	0.14	2.01	1.1	7.2
25 lb	NE-90	0.59	N	0.59	0.14	2.01	1.1	7.2
25 lb	NE-91	0.51	N	0.51	0.14	2.01	1.1	7.2
25 lb	NE-92	0.07	N	0.07	0.14	2.01	1.1	7.2
25 lb	NE-93	0.19	N	0.19	0.14	2.01	1.1	7.2
25 lb	NE-94	0.55	N	0.55	0.14	2.01	1.1	7.2
25 lb	NE-95	0.27	N	0.27	0.14	2.01	1.1	7.2
25 lb	NE-96	0.57	N	0.57	0.14	2.01	1.1	7.2
25 lb	NE-97	0.46	N	0.46	0.14	2.01	1.1	7.2
25 lb	NE-98	0.29	N	0.29	0.14	2.01	1.1	7.2
25 lb	NE-99	0.24	N	0.24	0.14	2.01	1.1	7.2
25 lb	NE-100	0.79	N	0.79	0.14	2.01	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

8/20/2024

Date of Issue

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Calibration Date: 8/6/2024

**Certificate of Calibration
of Volume Transfer**

Certificate Number: 2024-104-5

Items Submitted:

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

Submitted By: FSCP Area 30
3721 West Cuming St.
Lincoln, NE 68524

POC: NDA-Weights and Measures
402-471-3422
agr.wam@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 D	SS	0.0000265	4.9983 gal	4.9983 gal	0.0012 gal	2.01
5 gal	40702 C	SS	0.0000265	4.9989 gal	4.9989 gal	0.0012 gal	2.01

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 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:

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Condition of Item(s) Submitted for Calibration:

Cleaned and ready for calibration

Laboratory Reference Standard Used:

5 gal SP NE 1586

Treatment of Item(s) before Calibration:

Tested as Found

Procedure Used:

NISTIR 7383, SOP 19 (2019)

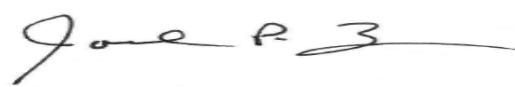
Environmental conditions at time of calibration:

Temp °C	23.9	Humidity %	47.0
Pressure mmHg	734.00		

Water temperature at time of calibration:

76.35 °F

Date Submitted: 8/5/2024



Joel P. Lavicky, Metrologist

8/21/2022

Issue Date:

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Calibration Date: 8/8/2024

**Certificate of Calibration
of Volume Transfer**

Certificate Number: 2024-104-6

Items Submitted:

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

Submitted By: FSCP Area 30
3721 West Cuming St.
Lincoln, NE 68524

POC: NDA-Weights and Measures
402-471-3422
agr.wam@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	16623-01	SS	0.0000265	4.9992 gal	4.9992 gal	0.0010 gal	2.01
5 gal	16623-02	SS	0.0000265	4.9987 gal	4.9987 gal	0.0010 gal	2.01
5 gal	16623-03	SS	0.0000265	4.9996 gal	4.9996 gal	0.0010 gal	2.01

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 in³
1 gal = 3.785 412 E-03 m³

Traceability Statement:

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Condition of Item(s) Submitted for Calibration:

Cleaned and ready for calibration

Laboratory Reference Standard Used:

5 gal SP NE 1586

Treatment of Item(s) before Calibration:

Tested as Found

Procedure Used:

NISTIR 7383, SOP 19 (2019)

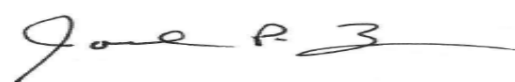
Environmental conditions at time of calibration:

Temp °C	Humidity %
23.1	54.1
Pressure mmHg	732.60

Water temperature at time of calibration:

72.82 °F

Date Submitted: 8/5/2024



Joel P. Lavicky, Metrologist

8/21/2022

Issue Date:

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Calibration Certificate of Mass

Calibration Date: August 7, 2024

Certificate Number: 2024-104-2

Artifact(s) Owner: FSCP Area 30
3721 West Cuming St.
Lincoln, NE 68524

Submitted by: State of Nebraska
Point of Contact: NDA-Weights and Measures
Ph. 402-471-3422
email: agr.wam@nebraska.gov

Test Item(s): lb weight kit
Serial Number(s): NE-WM-18-1
Condition: Excellent (little wear)
Material: Stainless steel & Aluminum

Artifact(s) Description:

Date Received: August 5, 2024
ID / Asset Number: Area-30
Class Specification: NIST Class F
Manufacture: Rice Lake

Reference Standards Used:

NSL lb standards

Procedure Used:

NIST HB 6969, SOP 8 (2019)

Metrologist:

JPL

Equipment Used:

Sartorius MCM5004

Sartorius CC 1201

Environmental Cond. **Temp:** 21.37 °C **Pressure:** 728.71 mmHg **Relative Humidity:** 51.86 %

Pertinent Information

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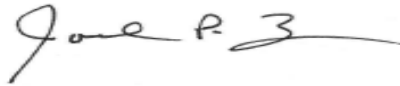
Calibration Results

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 ³)
5 lb	1	0.027	n	0.027	0.028	2	0.23	7.84
5 lb	2	0.037	n	0.037	0.028	2	0.23	7.84
5 lb	3	0.070	n	0.070	0.028	2	0.23	7.84
5 lb	4	0.081	n	0.081	0.028	2	0.23	7.84
5 lb	5	0.053	n	0.053	0.028	2	0.23	7.84
1 lb	6	0.0287	n	0.0287	0.0083	2	0.07	7.84
1 lb	7	0.0185	n	0.0185	0.0083	2	0.07	7.84
1 lb	8	0.0110	n	0.0110	0.0083	2	0.07	7.84
1 lb	9	0.0245	n	0.0245	0.0083	2	0.07	7.84
1 lb	10	0.0127	n	0.0127	0.0083	2	0.07	7.84
0.5 lb	11	0.0118	n	0.0118	0.0054	2.002	0.045	7.84
0.2 lb		0.0071	n	0.0071	0.0022	2.002	0.018	7.84
0.2 lb	*	0.0064	n	0.0064	0.0022	2.002	0.018	7.84
0.1 lb		0.0066	n	0.0066	0.0011	2.002	0.0091	7.84
0.05 lb		0.00120	n	0.00120	0.00054	2.002	0.0045	7.84
0.02 lb		0.00072	n	0.00072	0.00021	2.002	0.0018	7.84
0.02 lb	*	0.00089	n	0.00089	0.00021	2.002	0.0018	7.84
0.01 lb		0.00056	n	0.00056	0.00018	2.002	0.0015	7.84
0.005 lb		0.00105	n	0.00105	0.00015	2.002	0.0012	2.7
0.002 lb		0.00064	n	0.00064	0.00011	2.002	0.00087	2.7
0.001 lb		0.000445	n	0.000445	0.000084	2.002	0.0007	2.7

Conversion Factors

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Joel P. Lavicky Metrologist

8/20/2024

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