NEBRASKA
Good Life. Great Roots.
DEPARTMENT OF AGRICULTURE

Nebraska Standards Laboratory
3721 West Cuming St.
Lincoln, NE 68524
(402)-471-2087

Director of Agriculture
Steve Wellman
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Calibration Certificate of Mass

Calibration Date: August 23, 2019 | **Certificate Number:** 2019-110-1

Submitted By: FSCP Area 20
3721 West Cuming St.
Lincoln, NE 68524

Point of Contact: Kurt Wenninghoff
Ph. 402-471-3422
email: *kurt.wenninghoff@nebraska.gov*
PO Number: N/A

Test Item(s): (20)-25lb, (4)-50 & (20)-1000lb weights
Serial Number(s): See Next Page
Manufacture: Various
Condition: Fair (significant wear)

Artifact(s) Description:

Date Received: August 16, 2019
ID / Asset Number: FSCP Area 20
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 KA30-3
Mettler XP 604

Environmental Cond. **Temp:** 23 °C **Pressure:** 762.5 mmHg **Relative Humidity:** 54 %

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 (2013) and/or NIST HB 105-1 (1990).

- 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.

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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/cm³)
25 lb	WM25-1	-0.02	N	-0.02	0.14	2	1.1	7.2
25 lb	WM25-1S	0.12	N	0.12	0.14	2	1.1	7.2
25 lb	WM25-2	-0.61	N	-0.61	0.14	2	1.1	7.2
25 lb	WM25-3	0.39	N	0.39	0.14	2	1.1	7.2
25 lb	WM25-4	-0.32	N	-0.32	0.14	2	1.1	7.2
25 lb	WM25-5	-0.05	N	-0.05	0.14	2	1.1	7.2
25 lb	WM25-6	0.85	N	0.85	0.14	2	1.1	7.2
25 lb	WM25-7	0.24	N	0.24	0.14	2	1.1	7.2
25 lb	WM25-8	-0.85	N	-0.85	0.14	2	1.1	7.2
25 lb	WM25-10	-1.10	Y	0.06	0.14	2	1.1	7.2
25 lb	WM25-11	-1.13	Y	-0.15	0.14	2	1.1	7.2
25 lb	WM25-12	0.34	N	0.34	0.14	2	1.1	7.2
25 lb	WM25-13	-0.87	N	-0.87	0.14	2	1.1	7.2
25 lb	WM25-14	-0.37	N	-0.37	0.14	2	1.1	7.2
25 lb	WM25-15	-0.69	N	-0.69	0.14	2	1.1	7.2
25 lb	WM25-16	-0.73	N	-0.73	0.14	2	1.1	7.2
25 lb	WM25-17	-1.02	Y	-0.27	0.14	2	1.1	7.2
25 lb	WM25-18	-0.58	N	-0.58	0.14	2	1.1	7.2
25 lb	WM25-19	-0.40	N	-0.40	0.14	2	1.1	7.2
25 lb	WM25-20	-1.07	Y	-0.05	0.14	2	1.1	7.2
50 lb	A5C*13	-2.36	Y	-0.06	0.28	2	2.3	7.2
50 lb	A5C*20	1.80	N	1.80	0.28	2	2.3	7.2
50 lb	WM-OPI-C85	-3.47	Y	0.10	0.28	2	2.3	7.2
50 lb	WM-OPI-C81	2.68	Y	1.29	0.28	2	2.3	7.2
1000 lb	2189	-37.5	N	-37.5	5.7	2.009	45	7.2
1000 lb	2190	-36.6	N	-36.6	5.7	2.009	45	7.2
1000 lb	2191	-39.8	Y	15.4	5.7	2.009	45	7.2
1000 lb	2192	-20.9	N	-20.9	5.7	2.009	45	7.2
1000 lb	2194	-31.0	N	-31.0	5.7	2.009	45	7.2
1000 lb	2195	-64.9	Y	17.2	5.7	2.009	45	7.2
1000 lb	2196	10.1	N	10.1	5.7	2.009	45	7.2
1000 lb	2197	-63.0	Y	13.8	5.7	2.009	45	7.2
1000 lb	2198	-2.3	N	-2.3	5.7	2.009	45	7.2
1000 lb	A-1	-58.9	Y	16.7	5.7	2.009	45	7.2
1000 lb	A-3	-41.7	Y	12.9	5.7	2.009	45	7.2
1000 lb	A-4	-48.7	Y	16.4	5.7	2.009	45	7.2
1000 lb	A-7	-15.9	N	-15.9	5.7	2.009	45	7.2
1000 lb	A-8	-16.2	N	-16.2	5.7	2.009	45	7.2
1000 lb	A-9	-64.9	Y	17.8	5.7	2.009	45	7.2
1000 lb	A-10	-53.9	Y	15.1	5.7	2.009	45	7.2
1000 lb	A-14	-42.1	Y	15.0	5.7	2.009	45	7.2
1000 lb	A-17	-10.4	N	-10.4	5.7	2.009	45	7.2
1000 lb	A-18	-17.8	N	-17.8	5.7	2.009	45	7.2
1000 lb	A-20	-9.1	N	-9.1	5.7	2.009	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*

8/27/2019
Date of Issue