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*
P.O. Box 94947
Lincoln, NE 68509-4947
(402) 471-2341
www.nda.nebraska.gov

# *Calibration Certificate of Mass*

**Calibration Date:** June 29, 2022 | **Certificate Number:** 2022-089-1

**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:** N/A

**Test Item(s):** Cast weights
**ID / Asset Number:** **Area 55**
**Manufacture:** Various
**Material:** Cast iron

**Artifact(s) Description:**

**Date Received:** June 27, 2022
**Serial Number(s):** See Next Page
**Class Specification:** NIST Class F
**Condition:** Good (some wear)

**Reference Standards Used:**
NSL lb standards
OPI & /Den Metric

**Procedure Used:**
NIST HB 6969, SOP 8 (2019)
**Metrologist:**
JPL

**Equipment Used:**
Mettler XP 604 Sartorius CC10000S
Mettler XPR32003

**Environmental Cond.** **Temp:** 22.9 °C **Pressure:** 732.2 mmHg **Relative Humidity:** 46.9 %

## 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. 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 (2018) 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.

- 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

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.

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*
P.O. Box 94947
Lincoln, NE 68509-4947
(402) 471-2341
www.nda.nebraska.gov

**Calibration Date:** June 29, 2022 | **Certificate Number:** 2022-089-1

## 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/cm³) |
|---|---|---|---|---|---|---|---|---|
| 15 lb | WM15-19 | -0.215 | N | -0.215 | 0.084 | 2 | 0.68 | 7.2 |
| 15 lb | WM15-20 | -0.385 | N | -0.385 | 0.084 | 2 | 0.68 | 7.2 |
| 25 lb | NE-21 | 0.04 | N | 0.04 | 0.14 | 2 | 1.1 | 7.2 |
| 25 lb | NE-22 | -0.01 | N | -0.01 | 0.14 | 2 | 1.1 | 7.2 |
| 25 lb | NE-23 | -0.52 | N | -0.52 | 0.14 | 2 | 1.1 | 7.2 |
| 25 lb | NE-24 | -0.28 | N | -0.28 | 0.14 | 2 | 1.1 | 7.2 |
| 25 lb | NE-25 | -0.69 | N | -0.69 | 0.14 | 2 | 1.1 | 7.2 |
| 25 lb | NE-26 | 0.11 | N | 0.11 | 0.14 | 2 | 1.1 | 7.2 |
| 25 lb | NE-27 | -0.36 | N | -0.36 | 0.14 | 2 | 1.1 | 7.2 |
| 25 lb | NE-28 | -0.19 | N | -0.19 | 0.14 | 2 | 1.1 | 7.2 |
| 25 lb | NE-29 | -0.52 | N | -0.52 | 0.14 | 2 | 1.1 | 7.2 |
| 25 lb | NE-30 | -0.51 | N | -0.51 | 0.14 | 2 | 1.1 | 7.2 |
| 25 lb | NE-31 | -1.12 | Y | -0.09 | 0.14 | 2 | 1.1 | 7.2 |
| 25 lb | NE-32 | -0.51 | N | -0.51 | 0.14 | 2 | 1.1 | 7.2 |
| 25 lb | NE-33 | -0.49 | N | -0.49 | 0.14 | 2 | 1.1 | 7.2 |
| 25 lb | NE-34 | -0.85 | N | -0.85 | 0.14 | 2 | 1.1 | 7.2 |
| 25 lb | NE-35 | -0.56 | N | -0.56 | 0.14 | 2 | 1.1 | 7.2 |
| 25 lb | NE-36 | -0.17 | N | -0.17 | 0.14 | 2 | 1.1 | 7.2 |
| 25 lb | NE-37 | -0.50 | N | -0.50 | 0.14 | 2 | 1.1 | 7.2 |
| 25 lb | NE-38 | -0.11 | N | -0.11 | 0.14 | 2 | 1.1 | 7.2 |
| 25 lb | NE-39 | 0.22 | N | 0.22 | 0.14 | 2 | 1.1 | 7.2 |
| 25 lb | NE-40 | -0.19 | N | -0.19 | 0.14 | 2 | 1.1 | 7.2 |
| 25 lb | WM-D27 | -0.66 | N | -0.66 | 0.14 | 2 | 1.1 | 7.2 |
| 25 lb | WM-D31 | -1.02 | Y | 0.26 | 0.14 | 2 | 1.1 | 7.2 |
| 25 lb | WM-D32 | -1.28 | Y | 0.07 | 0.14 | 2 | 1.1 | 7.2 |
| 25 lb | WM-D33 | -0.85 | N | -0.85 | 0.14 | 2 | 1.1 | 7.2 |
| 25 lb | WM-D34 | -0.97 | Y | 0.18 | 0.14 | 2 | 1.1 | 7.2 |
| 25 lb | WM-D35 | -0.75 | N | -0.75 | 0.14 | 2 | 1.1 | 7.2 |
| 25 lb | WM-D36 | -0.32 | N | -0.32 | 0.14 | 2 | 1.1 | 7.2 |
| 25 lb | WM-D37 | -0.13 | N | -0.13 | 0.14 | 2 | 1.1 | 7.2 |
| 25 lb | WM-D38 | -0.85 | N | -0.85 | 0.14 | 2 | 1.1 | 7.2 |
| 25 lb | WM-D39 | -0.35 | N | -0.35 | 0.14 | 2 | 1.1 | 7.2 |
| 25 lb | WM-D40 | -0.83 | N | -0.83 | 0.14 | 2 | 1.1 | 7.2 |
| 25 lb | WM-D41 | -0.80 | N | -0.80 | 0.14 | 2 | 1.1 | 7.2 |
| 25 lb | WM-D42 | -1.16 | Y | -0.02 | 0.14 | 2 | 1.1 | 7.2 |
| 25 lb | WM-D43 | -0.82 | N | -0.82 | 0.14 | 2 | 1.1 | 7.2 |
| 25 lb | WM-D44 | -0.64 | N | -0.64 | 0.14 | 2 | 1.1 | 7.2 |
| 25 lb | WM-D45 | -0.06 | N | -0.06 | 0.14 | 2 | 1.1 | 7.2 |
| 25 lb | WM-D46 | -0.93 | Y | 0.30 | 0.14 | 2 | 1.1 | 7.2 |
| 25 lb | WM-D47 | -0.74 | N | -0.74 | 0.14 | 2 | 1.1 | 7.2 |
| 25 lb | WM-D48 | -0.65 | N | -0.65 | 0.14 | 2 | 1.1 | 7.2 |
| 25 lb | WM-D49 | -0.79 | N | -0.79 | 0.14 | 2 | 1.1 | 7.2 |
| 50 lb | WM-OPI-C74 | -1.59 | N | -1.59 | 0.28 | 2 | 2.3 | 7.2 |
| 50 lb | OPI-C64 | -0.10 | N | -0.10 | 0.28 | 2 | 2.3 | 7.2 |
| 50 lb | OPI-C71 | -0.81 | N | -0.81 | 0.28 | 2 | 2.3 | 7.2 |
| 50 lb | OPI-C65 | -1.58 | N | -1.58 | 0.28 | 2 | 2.3 | 7.2 |
| 50 lb | OPI-C61 | -0.94 | N | -0.94 | 0.28 | 2 | 2.3 | 7.2 |
| 50 lb | WM-OPI-C84 | -0.48 | N | -0.48 | 0.28 | 2 | 2.3 | 7.2 |
| 1000 lb | B2 | 23.6 | N | 23.6 | 5.8 | 2.019 | 45 | 7.2 |
| 1000 lb | B3 | 7.5 | N | 7.5 | 5.8 | 2.019 | 45 | 7.2 |
| 1000 lb | B4 | -9.2 | N | -9.2 | 5.8 | 2.019 | 45 | 7.2 |
| 1000 lb | B5 | -9.1 | N | -9.1 | 5.8 | 2.019 | 45 | 7.2 |

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*
P.O. Box 94947
Lincoln, NE 68509-4947
(402) 471-2341
www.nda.nebraska.gov

**Calibration Date:** June 29, 2022 | **Certificate Number:** 2022-089-1

## 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/cm³) |
|---|---|---|---|---|---|---|---|---|
| 1000 lb | B6 | -0.7 | N | -0.7 | 5.8 | 2.019 | 45 | 7.2 |
| 1000 lb | B7 | 1.6 | N | 1.6 | 5.8 | 2.019 | 45 | 7.2 |
| 1000 lb | B8 | 8.8 | N | 8.8 | 5.8 | 2.019 | 45 | 7.2 |
| 1000 lb | B9 | 15.0 | N | 15.0 | 5.8 | 2.019 | 45 | 7.2 |
| 1000 lb | B10 | -5.0 | N | -5.0 | 5.8 | 2.019 | 45 | 7.2 |
| 1000 lb | B12 | -23.5 | N | -23.5 | 5.8 | 2.019 | 45 | 7.2 |
| 1000 lb | B13 | -1.0 | N | -1.0 | 5.8 | 2.019 | 45 | 7.2 |
| 1000 lb | B14 | -2.5 | N | -2.5 | 5.8 | 2.019 | 45 | 7.2 |
| 1000 lb | B17 | -21.7 | N | -21.7 | 5.8 | 2.019 | 45 | 7.2 |
| 1000 lb | B18 | 31.6 | N | 31.6 | 5.8 | 2.019 | 45 | 7.2 |
| 1000 lb | B19 | 28.5 | N | 28.5 | 5.8 | 2.019 | 45 | 7.2 |
| 1000 lb | B20 | 6.0 | N | 6.0 | 5.8 | 2.019 | 45 | 7.2 |
| 1000 lb | B21 | 9.7 | N | 9.7 | 5.8 | 2.019 | 45 | 7.2 |
| 1000 lb | B23 | 11.8 | N | 11.8 | 5.8 | 2.019 | 45 | 7.2 |
| 4 kg | 6H85 | -0.246 | N | -0.246 | 0.048 | 2 | 0.4 | 7.84 |

**Conversion Factors**

1 ounce (avoirdupois) (oz) = 28.349 52 g
1 pound (avoirdupois) (lb) = 453.592 37 g exactly

e-signature is copy only

**Joel P. Lavicky Metrologist**

7/11/2022
**Date of Issue**

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*
P.O. Box 94947
Lincoln, NE 68509-4947
(402) 471-2341
www.nda.nebraska.gov

# Calibration Certificate of Mass

**Calibration Date:** June 29, 2022 | **Certificate Number:** 2022-089-2

**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:** N/A

**Test Item(s):** lb weight kit
**Serial Number(s):** 13A9
**Manufacture:** Troemner
**Material:** Stainless Steel & Aluminum

**Artifact(s) Description:**

**Date Received:** June 27, 2022
**ID / Asset Number:** Area 55
**Class Specification:** NIST Class F
**Condition:** Good (some wear)

**Reference Standards Used:**
NSL lb standards

**Procedure Used:**
NIST HB 6969, SOP 8 (2019)

**Metrologist:**
JPL

**Equipment Used:**
Sartorius CC10000S
Mettler XPR 205
Sartorius CC 1201
Sartorius CCE6

**Environmental Cond.** **Temp:** 21.66 °C **Pressure:** 731.77 mmHg **Relative Humidity:** 49.69 %

## 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. 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 (2018) 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.

- 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.

## 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.

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*
P.O. Box 94947
Lincoln, NE 68509-4947
(402) 471-2341
www.nda.nebraska.gov

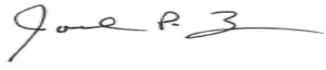
**Calibration Date:** June 29, 2022 | **Certificate Number:** 2022-089-2

## 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/cm³) |
|---|---|---|---|---|---|---|---|---|
| 2 lb | 1 | -0.005 | n | -0.005 | 0.011 | 2 | 0.091 | 7.84 |
| 2 lb | 2 | -0.044 | n | -0.044 | 0.011 | 2 | 0.091 | 7.84 |
| 2 lb | 3 | -0.044 | n | -0.044 | 0.011 | 2 | 0.091 | 7.84 |
| 2 lb | 4 | -0.050 | n | -0.050 | 0.011 | 2 | 0.091 | 7.84 |
| 2 lb | 5 | -0.043 | n | -0.043 | 0.011 | 2 | 0.091 | 7.84 |
| 2 lb | 6 | -0.061 | n | -0.061 | 0.011 | 2 | 0.091 | 7.84 |
| 2 lb | 7 | -0.048 | n | -0.048 | 0.011 | 2 | 0.091 | 7.84 |
| 2 lb | 8 | 0.001 | n | 0.001 | 0.011 | 2 | 0.091 | 7.84 |
| 2 lb | 9 | -0.039 | n | -0.039 | 0.011 | 2 | 0.091 | 7.84 |
| 2 lb | 10 | -0.041 | n | -0.041 | 0.011 | 2 | 0.091 | 7.84 |
| 2 lb | 11 | -0.037 | n | -0.037 | 0.011 | 2 | 0.091 | 7.84 |
| 2 lb | 12 | -0.017 | n | -0.017 | 0.011 | 2 | 0.091 | 7.84 |
| 2 lb | 13 | -0.061 | n | -0.061 | 0.011 | 2 | 0.091 | 7.84 |
| 2 lb | 14 | -0.050 | n | -0.050 | 0.011 | 2 | 0.091 | 7.84 |
| 1 lb | 15 | -0.0184 | n | -0.0184 | 0.0083 | 2 | 0.07 | 7.84 |
| 1 lb | 16 | -0.0213 | n | -0.0213 | 0.0083 | 2 | 0.07 | 7.84 |
| 0.3 lb | | 0.0026 | n | 0.0026 | 0.0033 | 2 | 0.027 | 7.84 |
| 0.2 lb | | -0.0018 | n | -0.0018 | 0.0022 | 2 | 0.018 | 7.84 |
| 0.1 lb | | -0.0016 | n | -0.0016 | 0.0011 | 2 | 0.0091 | 7.84 |
| 0.05 lb | | -0.00045 | n | -0.00045 | 0.00054 | 2 | 0.0045 | 7.84 |
| 0.03 lb | | -0.00125 | n | -0.00125 | 0.00032 | 2 | 0.0027 | 7.84 |
| 0.02 lb | | -0.00001 | n | -0.00001 | 0.00022 | 2 | 0.0018 | 7.84 |
| 0.01 lb | | 0.00052 | n | 0.00052 | 0.00018 | 2 | 0.0015 | 7.84 |
| 0.005 lb | | -0.00003 | n | -0.00003 | 0.00014 | 2 | 0.0012 | 2.7 |
| 0.003 lb | | 0.00079 | n | 0.00079 | 0.00012 | 2 | 0.00099 | 2.7 |
| 0.002 lb | | 0.00064 | n | 0.00064 | 0.00011 | 2 | 0.00087 | 2.7 |
| 0.001 lb | | 0.000107 | n | 0.000107 | 0.000083 | 2 | 0.0007 | 2.7 |
| 0.001 lb | * | -0.000293 | n | -0.000293 | 0.000083 | 2 | 0.0007 | 2.7 |
| 8 oz | | -0.0127 | n | -0.0127 | 0.0054 | 2 | 0.045 | 7.84 |
| 4 oz | | 0.0025 | n | 0.0025 | 0.0028 | 2 | 0.023 | 7.84 |
| 2 oz | | 0.0015 | n | 0.0015 | 0.0013 | 2 | 0.011 | 7.84 |
| 1 oz | | 0.00205 | n | 0.00205 | 0.00064 | 2 | 0.0054 | 7.84 |
| 1/2 oz | | -0.00060 | n | -0.00060 | 0.00034 | 2 | 0.0028 | 7.84 |
| 1/4 oz | | -0.00017 | n | -0.00017 | 0.00021 | 2 | 0.0017 | 7.84 |
| 1/8 oz | | -0.00006 | n | -0.00006 | 0.00016 | 2 | 0.0013 | 7.84 |
| 1/16 oz | | 0.00055 | n | 0.00055 | 0.00013 | 2 | 0.0011 | 7.84 |
| 1/16 oz | * | 0.00031 | n | 0.00031 | 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



e-signature is copy only

*Joel P. Lavicky* *Metrologist*

7/11/2022
**Date of Issue**

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*
P.O. Box 94947
Lincoln, NE 68509-4947
(402) 471-2341
www.nda.nebraska.gov

# Calibration Certificate of Mass

**Calibration Date:** June 29, 2022 | **Certificate Number:** 2022-089-3

**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:** OMA-3744

**Test Item(s):** lb weight kit
**Serial Number(s):** WM-2A86
**Manufacture:** Rice Lake
**Material:** Stainless Steel & Aluminum

**Artifact(s) Description:**

**Date Received:** June 27, 2022
**ID / Asset Number:** Area 55
**Class Specification:** NIST Class F
**Condition:** Good (some wear)

**Reference Standards Used:**
NSL lb standards

**Procedure Used:**
NIST HB 6969, SOP 8 (2019)

**Metrologist:**
JPL

**Equipment Used:**
Sartorius CC10000S
Mettler XPR 205
Sartorius CC 1201
Sartorius CCE6

**Environmental Cond.** **Temp:** 21.66 °C **Pressure:** 731.77 mmHg **Relative Humidity:** 49.69 %

## 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. 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 (2018) 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.

- 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.

## 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.

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*
P.O. Box 94947
Lincoln, NE 68509-4947
(402) 471-2341
www.nda.nebraska.gov

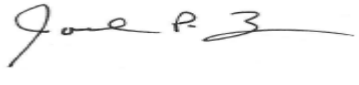
**Calibration Date:** June 29, 2022 | **Certificate Number:** 2022-089-3

## 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/cm³) |
|---|---|---|---|---|---|---|---|---|
| 5 lb | 1 | -0.147 | n | -0.147 | 0.028 | 2 | 0.23 | 7.84 |
| 5 lb | 2 | -0.128 | n | -0.128 | 0.028 | 2 | 0.23 | 7.84 |
| 5 lb | 3 | -0.136 | n | -0.136 | 0.028 | 2 | 0.23 | 7.84 |
| 5 lb | 4 | -0.154 | n | -0.154 | 0.028 | 2 | 0.23 | 7.84 |
| 5 lb | 5 | -0.110 | n | -0.110 | 0.028 | 2 | 0.23 | 7.84 |
| 1 lb | 1 | -0.0235 | n | -0.0235 | 0.0083 | 2 | 0.07 | 7.84 |
| 1 lb | 2 | -0.0098 | n | -0.0098 | 0.0083 | 2 | 0.07 | 7.84 |
| 1 lb | 3 | -0.0289 | n | -0.0289 | 0.0083 | 2 | 0.07 | 7.84 |
| 1 lb | 4 | -0.0009 | n | -0.0009 | 0.0083 | 2 | 0.07 | 7.84 |
| 1 lb | 5 | -0.0032 | n | -0.0032 | 0.0083 | 2 | 0.07 | 7.84 |
| 8 oz | | 0.0163 | n | 0.0163 | 0.0054 | 2 | 0.045 | 7.84 |
| 4 oz | | 0.0063 | n | 0.0063 | 0.0028 | 2 | 0.023 | 7.84 |
| 2 oz | | 0.0051 | n | 0.0051 | 0.0013 | 2 | 0.011 | 7.84 |
| 1 oz | | 0.00309 | n | 0.00309 | 0.00064 | 2 | 0.0054 | 7.84 |
| 1/2 oz | | 0.00052 | n | 0.00052 | 0.00034 | 2 | 0.0028 | 7.84 |
| 1/4 oz | | 0.00073 | n | 0.00073 | 0.00021 | 2 | 0.0017 | 7.84 |
| 1/8 oz | | 0.00057 | n | 0.00057 | 0.00016 | 2 | 0.0013 | 7.84 |
| 1/16 oz | | 0.00014 | n | 0.00014 | 0.00013 | 2 | 0.0011 | 7.84 |
| 1/32 oz | | 0.00020 | n | 0.00020 | 0.00011 | 2 | 0.00087 | 7.84 |
| 1/32 oz | * | 0.00049 | n | 0.00049 | 0.00011 | 2 | 0.00087 | 7.84 |

**Conversion Factors**

1 ounce (avoirdupois) (oz) = 28.349 52 g
1 pound (avoirdupois) (lb) = 453.592 37 g exactly



e-signature is copy only

***Joel P. Lavicky*** ***Metrologist***

7/11/2022
**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.*

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*
P.O. Box 94947
Lincoln, NE 68509-4947
(402) 471-2341
www.nda.nebraska.gov

# *Calibration Certificate of Mass*

**Calibration Date:** June 28, 2022 | **Certificate Number:** 2022-089-4

**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:** OMA-3744

**Test Item(s):** Metric Weight Kit
**Serial Number(s):** **WM-1G14**
**Condition:** Good (some wear)
**Material:** Stainless Steel

**Artifact(s) Description:**

**Date Received:** 6/27/2022
**ID / Asset Number:** **Area 55**
**Class Specification:** NIST Class F
**Manufacture:** Rice Lake

**Reference Standards Used:**
NSL & /Den Metric
Voland-1707

**Procedure Used:**
NIST HB 6969, SOP 8 (2019)

**Metrologist:**
JPL

**Equipment Used:**
Sartorius CC10000S
Sartorius CC 1201
Mettler XPR 205
Sartorius CCE6

**Environmental Cond.** **Temp:** 21.28 °C **Pressure:** 734.99 mmHg **Relative Humidity:** 50.35 %

## 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. 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 (2018) 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.

● 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.

## 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.

`

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*
P.O. Box 94947
Lincoln, NE 68509-4947
(402) 471-2341
www.nda.nebraska.gov

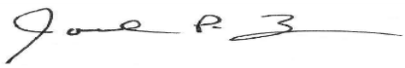
**Calibration Date:** June 28, 2022 | **Certificate Number:** 2022-089-4

## 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 | NIST Class F MPE ± (g) | Assumed Density (g/cm³) |
|---|---|---|---|---|---|---|---|---|
| 2 kg | | 0.070 | n | 0.070 | 0.024 | 2 | 0.2 | 7.84 |
| 1 kg | | 0.028 | n | 0.028 | 0.012 | 2 | 0.1 | 7.84 |
| 500 g | | 0.0202 | n | 0.0202 | 0.0083 | 2 | 0.07 | 7.84 |
| 200 g | | 0.0092 | n | 0.0092 | 0.005 | 2 | 0.04 | 7.84 |
| 200 g | * | 0.0099 | n | 0.0099 | 0.005 | 2 | 0.04 | 7.84 |
| 100 g | | 0.0061 | n | 0.0061 | 0.0024 | 2 | 0.02 | 7.84 |
| 50 g | | 0.0027 | n | 0.0027 | 0.0012 | 2 | 0.01 | 7.84 |
| 20 g | | 0.00110 | n | 0.00110 | 0.00048 | 2 | 0.004 | 7.84 |
| 20 g | * | 0.00101 | n | 0.00101 | 0.00048 | 2 | 0.004 | 7.84 |
| 10 g | | 0.00080 | n | 0.00080 | 0.00024 | 2 | 0.002 | 7.84 |
| 5 g | | 0.00038 | n | 0.00038 | 0.00018 | 2 | 0.0015 | 7.84 |
| 2 g | | 0.00031 | n | 0.00031 | 0.00014 | 2 | 0.0011 | 7.84 |
| 2 g | * | 0.00026 | n | 0.00026 | 0.00014 | 2 | 0.0011 | 7.84 |
| 1 g | | 0.00023 | n | 0.00023 | 0.00011 | 2 | 0.0009 | 7.84 |

**Conversion Factors**

1 ounce (avoirdupois) (oz) = 28.349 52 g
1 pound (avoirdupois) (lb) = 453.592 37 g exactly



e-signature is copy only

*Joel P. Lavicky* *Metrologist*

7/11/2022
**Date of Issue**

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*
P.O. Box 94947
Lincoln, NE 68509-4947
(402) 471-2341
www.nda.nebraska.gov

**Calibration Date:** 6/28/2022

# *Certificate of Calibration of Volume Transfer*

**Certificate Number:** 2022-089-5

**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-A | SS | 0.0000265 | **4.9998 gal** | **4.9998 gal** | 0.0012 gal | 2.02 |
| 5 gal | 4393-5-D | SS | 0.0000265 | **4.9990 gal** | **4.9990 gal** | 0.0012 gal | 2.02 |

*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:**

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. It is the decision of the Laboratory to adjust the artifact(s) when the sum of the correction and uncertainty exceed 95% of the maximum permissible error. All of the tolerances and specifications were evaluated according to NIST HB 105-3 (2010).

**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 (2019)

**Environmental conditions at time of calibration:**

| | | | |
|---|---|---|---|
| Temp ˚C | 23.0 | Humidity % | 48.1 |
| Pressure mmHg | 732.10 | | |

**Water temperature at time of calibration:**
72.72 °F

**Date Submitted:** 6/27/2022

E-signature is copy only

**Joel P. Lavicky, Metrologist**

**7/11/2022**
Issue Date:

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*
P.O. Box 94947
Lincoln, NE 68509-4947
(402) 471-2341
www.nda.nebraska.gov

**Calibration Date:** 6/29/2022

# *Certificate of Calibration of Volume Transfer*

**Certificate Number:** 2022-089-6

**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 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 | 0233 | SS | 0.0000265 | **5.0007 gal** | **5.0007 gal** | 0.0010 gal | 2.01 |
| 5 gal | 0234 | SS | 0.0000265 | **4.9985 gal** | **4.9985 gal** | 0.0010 gal | 2.01 |
| 5 gal | 0235 | SS | 0.0000265 | **4.9983 gal** | **4.9983 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:**

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. It is the decision of the Laboratory to adjust the artifact(s) when the sum of the correction and uncertainty exceed 95% of the maximum permissible error. All of the tolerances and specifications were evaluated according to NIST HB 105-3 (2010).

**Condition of Item(s) Submitted for Calibration:**
Good

**Treatment of Item(s) before Calibration:**
Tested as Found

**Environmental conditions at time of calibration:**

| | | | |
|---|---|---|---|
| Temp ˚C | 22.8 | Humidity % | 44.7 |
| Pressure mmHg | 730.50 | | |

**Laboratory Reference Standard Used;**
5 gal SP NE 1586

**Procedure Used:**
NISTIR 7383, SOP 19 (2019)

**Water temperature at time of calibration:**
73.15 °F

**Date Submitted:** 6/27/2022

E-signature is copy only

**Joel P. Lavicky, Metrologist**

**7/11/2022**
Issue Date: