

# Calibration Certificate of Mass

Calibration Date: October 10, 2019

Certificate Number: 2019-131-1

**Submitted By:** FSCP Area 25  
3721 West Cuming St.  
Lincoln, NE 68524

**Point of Contact:** James Johnson  
Ph. 402-471-3422  
**email:** james.f.johnson@nebraska.gov  
**PO Number:** N/A

**Test Item(s):** (2)-15, (20)-25, (20)-50 & (21)-1000lb weights**Serial Number(s):** See Next Page**Manufacture:** Various**Condition:** Fair (significant wear)**Artifact(s) Description:****Date Received:** October 8, 2019**ID / Asset Number:** FSCP 25**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:** 19.9 °C**Pressure:** 762.5 mmHg**Relative Humidity:** 50 %**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/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 10, 2019

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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        | WM15-17            | 0.471                                     | N              | 0.471                                    | 0.083             | 2          | 0.68                   | 7.2                                  |
| 15 lb        | WM15-18            | 0.716                                     | Y              | 0.446                                    | 0.083             | 2          | 0.68                   | 7.2                                  |
| 25 lb        | NE-41              | 0.38                                      | N              | 0.38                                     | 0.14              | 2          | 1.1                    | 7.2                                  |
| 25 lb        | NE-42              | 0.68                                      | N              | 0.68                                     | 0.14              | 2          | 1.1                    | 7.2                                  |
| 25 lb        | NE-43              | 0.45                                      | N              | 0.45                                     | 0.14              | 2          | 1.1                    | 7.2                                  |
| 25 lb        | NE-44              | 1.03                                      | Y              | 0.65                                     | 0.14              | 2          | 1.1                    | 7.2                                  |
| 25 lb        | NE-45              | 1.01                                      | Y              | 0.62                                     | 0.14              | 2          | 1.1                    | 7.2                                  |
| 25 lb        | NE-46              | 0.06                                      | N              | 0.06                                     | 0.14              | 2          | 1.1                    | 7.2                                  |
| 25 lb        | NE-47              | 0.84                                      | N              | 0.84                                     | 0.14              | 2          | 1.1                    | 7.2                                  |
| 25 lb        | NE-48              | 0.59                                      | N              | 0.59                                     | 0.14              | 2          | 1.1                    | 7.2                                  |
| 25 lb        | NE-49              | 0.27                                      | N              | 0.27                                     | 0.14              | 2          | 1.1                    | 7.2                                  |
| 25 lb        | NE-50              | 0.21                                      | N              | 0.21                                     | 0.14              | 2          | 1.1                    | 7.2                                  |
| 25 lb        | NE-51              | 0.23                                      | N              | 0.23                                     | 0.14              | 2          | 1.1                    | 7.2                                  |
| 25 lb        | NE-52              | 0.73                                      | N              | 0.73                                     | 0.14              | 2          | 1.1                    | 7.2                                  |
| 25 lb        | NE-53              | 0.24                                      | N              | 0.24                                     | 0.14              | 2          | 1.1                    | 7.2                                  |
| 25 lb        | NE-54              | 0.32                                      | N              | 0.32                                     | 0.14              | 2          | 1.1                    | 7.2                                  |
| 25 lb        | NE-55              | 0.00                                      | N              | 0.00                                     | 0.14              | 2          | 1.1                    | 7.2                                  |
| 25 lb        | NE-56              | 0.09                                      | N              | 0.09                                     | 0.14              | 2          | 1.1                    | 7.2                                  |
| 25 lb        | NE-57              | 0.75                                      | N              | 0.75                                     | 0.14              | 2          | 1.1                    | 7.2                                  |
| 25 lb        | NE-58              | 0.34                                      | N              | 0.34                                     | 0.14              | 2          | 1.1                    | 7.2                                  |
| 25 lb        | NE-59              | 0.97                                      | Y              | 0.46                                     | 0.14              | 2          | 1.1                    | 7.2                                  |
| 25 lb        | NE-60              | 0.94                                      | N              | 0.94                                     | 0.14              | 2          | 1.1                    | 7.2                                  |
| 50 lb        | A5C*2              | -2.12                                     | Y              | -0.26                                    | 0.28              | 2          | 2.3                    | 7.2                                  |
| 50 lb        | A5C*8              | -0.51                                     | N              | -0.51                                    | 0.28              | 2          | 2.3                    | 7.2                                  |
| 50 lb        | A5C*9              | 0.34                                      | N              | 0.34                                     | 0.28              | 2          | 2.3                    | 7.2                                  |
| 50 lb        | A5C*16             | -1.62                                     | N              | -1.62                                    | 0.28              | 2          | 2.3                    | 7.2                                  |
| 50 lb        | A5C*17             | 0.42                                      | N              | 0.42                                     | 0.28              | 2          | 2.3                    | 7.2                                  |
| 50 lb        | A5C*19             | 0.04                                      | N              | 0.04                                     | 0.28              | 2          | 2.3                    | 7.2                                  |
| 50 lb        | OPI-028            | -1.68                                     | N              | -1.68                                    | 0.28              | 2          | 2.3                    | 7.2                                  |
| 50 lb        | WM50-2             | 0.46                                      | N              | 0.46                                     | 0.28              | 2          | 2.3                    | 7.2                                  |
| 50 lb        | WM50-4             | -4.00                                     | Y              | 0.21                                     | 0.28              | 2          | 2.3                    | 7.2                                  |
| 50 lb        | WM50-11            | 0.65                                      | N              | 0.65                                     | 0.28              | 2          | 2.3                    | 7.2                                  |
| 50 lb        | WM50-14            | 0.07                                      | N              | 0.07                                     | 0.28              | 2          | 2.3                    | 7.2                                  |
| 50 lb        | WM50-17            | 0.77                                      | N              | 0.77                                     | 0.28              | 2          | 2.3                    | 7.2                                  |
| 50 lb        | WM50-18            | -0.85                                     | N              | -0.85                                    | 0.28              | 2          | 2.3                    | 7.2                                  |
| 50 lb        | WM50-19            | -0.26                                     | N              | -0.26                                    | 0.28              | 2          | 2.3                    | 7.2                                  |
| 50 lb        | WM50-23            | 1.10                                      | N              | 1.10                                     | 0.28              | 2          | 2.3                    | 7.2                                  |
| 50 lb        | WM50-24            | -0.18                                     | N              | -0.18                                    | 0.28              | 2          | 2.3                    | 7.2                                  |
| 50 lb        | WM50-27            | 0.65                                      | N              | 0.65                                     | 0.28              | 2          | 2.3                    | 7.2                                  |
| 50 lb        | WM50-38            | -0.98                                     | N              | -0.98                                    | 0.28              | 2          | 2.3                    | 7.2                                  |
| 50 lb        | WM50-45            | -0.82                                     | N              | -0.82                                    | 0.28              | 2          | 2.3                    | 7.2                                  |
| 50 lb        | WM50-57            | -0.74                                     | N              | -0.74                                    | 0.28              | 2          | 2.3                    | 7.2                                  |
| 50 lb        | T-CB-25            | 0.04                                      | N              | 0.04                                     | 0.28              | 2          | 2.3                    | 7.2                                  |
| 50 lb        | V828               | -1.98                                     | Y              | 0.17                                     | 0.28              | 2          | 2.3                    | 7.2                                  |
| 1000 lb      | C-12               | 19.8                                      | N              | 19.8                                     | 5.6               | 2.009      | 45                     | 7.2                                  |
| 1000 lb      | C-18               | 11.2                                      | N              | 11.2                                     | 5.6               | 2.009      | 45                     | 7.2                                  |
| 1000 lb      | C-21               | 24.7                                      | N              | 24.7                                     | 5.6               | 2.009      | 45                     | 7.2                                  |
| 1000 lb      | D-6                | -20.1                                     | N              | -20.1                                    | 5.6               | 2.009      | 45                     | 7.2                                  |
| 1000 lb      | D-7                | -10.9                                     | N              | -10.9                                    | 5.6               | 2.009      | 45                     | 7.2                                  |

Calibration Date: **October 10, 2019**

Certificate Number: **2019-131-1**

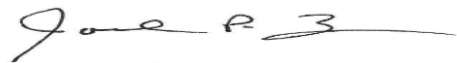
### Calibration Results

| 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> ) |
|--------------|--------------------|---|----------------|--|-------------------|------------|------------------------|--------------------------------------|
| 1000 lb      | D-8                | -26.7                                     | N              | -26.7                                    | 5.6               | 2.009      | 45                     | 7.2                                  |
| 1000 lb      | D-9                | -10.8                                     | N              | -10.8                                    | 5.6               | 2.009      | 45                     | 7.2                                  |
| 1000 lb      | D-12               | 19.4                                      | N              | 19.4                                     | 5.6               | 2.009      | 45                     | 7.2                                  |
| 1000 lb      | D-14               | -7.0                                      | N              | -7.0                                     | 5.6               | 2.009      | 45                     | 7.2                                  |
| 1000 lb      | D-15               | -20.4                                     | N              | -20.4                                    | 5.6               | 2.009      | 45                     | 7.2                                  |
| 1000 lb      | D-16               | -1.2                                      | N              | -1.2                                     | 5.6               | 2.009      | 45                     | 7.2                                  |
| 1000 lb      | D-17               | 3.0                                       | N              | 3.0                                      | 5.6               | 2.009      | 45                     | 7.2                                  |
| 1000 lb      | D-19               | -37.9                                     | N              | -37.9                                    | 5.6               | 2.009      | 45                     | 7.2                                  |
| 1000 lb      | D-20               | -18.9                                     | N              | -18.9                                    | 5.6               | 2.009      | 45                     | 7.2                                  |
| 1000 lb      | D-22               | -8.0                                      | N              | -8.0                                     | 5.6               | 2.009      | 45                     | 7.2                                  |
| 1000 lb      | D-23               | -28.4                                     | N              | -28.4                                    | 5.6               | 2.009      | 45                     | 7.2                                  |
| 1000 lb      | D-23               | -8.9                                      | N              | -8.9                                     | 5.6               | 2.009      | 45                     | 7.2                                  |
| 1000 lb      | D-23               | -13.4                                     | N              | -13.4                                    | 5.6               | 2.009      | 45                     | 7.2                                  |
| 1000 lb      | D-24               | -4.4                                      | N              | -4.4                                     | 5.6               | 2.009      | 45                     | 7.2                                  |
| 1000 lb      | D-25               | -40.2                                     | Y              | 8.7                                      | 5.6               | 2.009      | 45                     | 7.2                                  |
| 1000 lb      | D-27               | -7.4                                      | N              | -7.4                                     | 5.6               | 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

10/30/2019

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.

|                          |                  |  |                            |                   |
|--------------------------|------------------|--|----------------------------|-------------------|
| <b>Calibration Date:</b> | <b>10/9/2019</b> | <b>Certificate of Calibration<br/>of Volume Transfer</b> | <b>Certificate Number:</b> | <b>2019-131-2</b> |
|--------------------------|------------------|--|----------------------------|-------------------|

**Items Submitted:**

| Quantity | Nominal Volume | Manufacturer | Type                    |
|----------|----------------|--------------|-------------------------|
| 2        | 5 gal          | Seraphin     | Test Measure 4"<br>Neck |

**Submitted By:** FSCP Area 25  
 3721 West Cuming St.  
 Lincoln, NE 68524

**POC:** James Johnson  
 402-471-3422  
[james.f.johnson@nebraska.gov](mailto:james.f.johnson@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          | 39423 I       | SS       | 0.0000265                             | <b>4.9986 gal</b>                 | <b>4.9986 gal</b>                | 0.0010 gal      | 2.11 |
| 5 gal          | 39423 J       | SS       | 0.0000265                             | <b>5.0007 gal</b>                 | <b>5.0007 gal</b>                | 0.0010 gal      | 2.11 |

*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:**

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. 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 (2016)

**Environmental conditions at time of calibration:**

| Temp °C       | 20.1   | Humidity % | 52.5 |
|---------------|--------|------------|------|
| Pressure mmHg | 759.97 |            |      |

**Water temperature at time of calibration:**

66.33 °F

**Date Submitted:** 10/8/2019

10/30/2019

**Joel P. Lavicky, Metrologist**

Date:

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Calibration Date: 10/9/2019

**Certificate of Calibration  
of Volume Transfer**

Certificate Number: 2019-131-3

**Items Submitted:**

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

**Submitted By:** FSCP Area 25  
3721 West Cuming St.  
Lincoln, NE 68524

**POC:** James Johnson  
402-471-3422  
[james.f.johnson@nebraska.gov](mailto:james.f.johnson@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          | 99-10030-01   | SS       | 0.0000265                              | 4.99968 gal                       | 4.99968 gal                      | 0.00095 gal     | 2.04 |
| 5 gal          | 99-10030-02   | SS       | 0.0000265                              | 5.00073 gal                       | 5.00073 gal                      | 0.00095 gal     | 2.04 |
| 5 gal          | 99-10030-03   | SS       | 0.0000265                              | 4.99966 gal                       | 4.99966 gal                      | 0.00095 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)

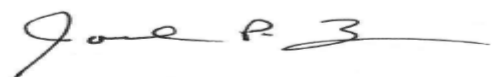
**Environmental conditions at time of calibration:**

|               |        |            |      |
|---------------|--------|------------|------|
| Temp °C       | 20.6   | Humidity % | 52.7 |
| Pressure mmHg | 757.68 |            |      |

**Water temperature at time of calibration:**

66.63 °F

**Date Submitted:** 10/8/2019



Joel P. Lavicky, Metrologist

10/30/2019

Date:

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