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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: August 8, 2022 | **Certificate Number:** 2022-111-1

Submitted By: FSCP Area 80
3721 West Cuming St.
Lincoln, NE 68524

Point of Contact: Cody Matlock
Ph. 402-471-3422
email: *cody.matlock@nebrska.gov*
PO Number: N/A

Test Item(s): Cast weights
ID / Asset Number: Area 80
Manufacture: Rice Lake
Material: Cast Iron

Artifact(s) Description:

Date Received: August 8, 2022
Serial Number(s): See Next Plage
Class Specification: NIST Class F
Condition: Good (some wear)

Reference Standards Used:	Procedure Used:	Equipment Used:
NSL lb standards	NIST HB 6969, SOP 8 (2019)	Mettler XPR32003

Metrologist:
JPL

Environmental Cond. **Temp:** 24.2 °C **Pressure:** 733.7 mmHg **Relative Humidity:** 46.6 %

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.

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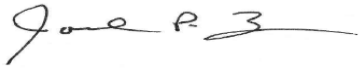
Calibration Date: August 8, 2022 | **Certificate Number:** 2022-111-1

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	WM15-11	-0.690	Y	-0.170	0.084	2	0.68	7.2
15 lb	WM15-12	-0.460	Y	0.060	0.084	2	0.68	7.2
25 lb	NE-1	-0.83	N	-0.83	0.14	2	1.1	7.2
25 lb	NE-2	-0.76	N	-0.76	0.14	2	1.1	7.2
25 lb	NE-3	-0.11	N	-0.11	0.14	2	1.1	7.2
25 lb	NE-4	-0.78	N	-0.78	0.14	2	1.1	7.2
25 lb	NE-5	-0.91	Y	-0.24	0.14	2	1.1	7.2
25 lb	NE-6	-0.66	N	-0.66	0.14	2	1.1	7.2
25 lb	NE-7	-0.07	N	-0.07	0.14	2	1.1	7.2
25 lb	NE-8	0.18	N	0.18	0.14	2	1.1	7.2
25 lb	NE-9	-0.42	N	-0.42	0.14	2	1.1	7.2
25 lb	NE-10	0.04	N	0.04	0.14	2	1.1	7.2
25 lb	NE-11	-0.16	N	-0.16	0.14	2	1.1	7.2
25 lb	NE-12	0.06	N	0.06	0.14	2	1.1	7.2
25 lb	NE-13	-0.20	N	-0.20	0.14	2	1.1	7.2
25 lb	NE-14	0.10	N	0.10	0.14	2	1.1	7.2
25 lb	NE-15	-0.05	N	-0.05	0.14	2	1.1	7.2
25 lb	NE-16	0.41	N	0.41	0.14	2	1.1	7.2
25 lb	NE-17	-0.46	N	-0.46	0.14	2	1.1	7.2
25 lb	NE-18	-0.19	N	-0.19	0.14	2	1.1	7.2
25 lb	NE-19	-0.01	N	-0.01	0.14	2	1.1	7.2
25 lb	NE-20	0.04	N	0.04	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



e-signature is copy only

Joel P. Lavicky *Metrologist*

8/12/2022
Date of Issue

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Calibration Certificate of Mass

Calibration Date: August 8, 2022 | **Certificate Number:** 2022-111-2

Submitted By: FSCP Area 80
3721 West Cuming St.
Lincoln, NE 68524

Point of Contact: Cody Matlock
Ph. 402-471-3422
email: *cody.matlock@nebrska.gov*
PO Number: N/A

Test Item(s): lb weight kit
Serial Number(s): 9-OPI-11
Manufacture: Troemner
Material: Stainless Steel & Aluminum

Artifact(s) Description:

Date Received: August 8, 2022
ID / Asset Number: Area 80
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:** 21.23 °C **Pressure:** 731.18 mmHg **Relative Humidity:** 49.05 %

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.

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www.nda.nebraska.gov

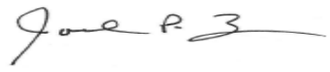
Calibration Date: August 8, 2022 | **Certificate Number:** 2022-111-2

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	-0.060	n	-0.060	0.011	2	0.091	7.84
2 lb	2	-0.060	n	-0.060	0.011	2	0.091	7.84
2 lb	3	-0.055	n	-0.055	0.011	2	0.091	7.84
2 lb	4	-0.037	n	-0.037	0.011	2	0.091	7.84
2 lb	5	-0.046	n	-0.046	0.011	2	0.091	7.84
2 lb	6	-0.036	n	-0.036	0.011	2	0.091	7.84
2 lb	7	-0.044	n	-0.044	0.011	2	0.091	7.84
2 lb	8	-0.063	n	-0.063	0.011	2	0.091	7.84
2 lb	9	-0.034	n	-0.034	0.011	2	0.091	7.84
2 lb	10	-0.057	n	-0.057	0.011	2	0.091	7.84
2 lb	11	-0.040	n	-0.040	0.011	2	0.091	7.84
2 lb	12	-0.051	n	-0.051	0.011	2	0.091	7.84
2 lb	13	-0.023	n	-0.023	0.011	2	0.091	7.84
2 lb	14	-0.062	n	-0.062	0.011	2	0.091	7.84
1 lb	15	-0.0304	n	-0.0304	0.0083	2	0.07	7.84
1 lb	16	-0.0275	n	-0.0275	0.0083	2	0.07	7.84
0.3 lb		-0.0103	n	-0.0103	0.0033	2	0.027	7.84
0.2 lb		-0.0039	n	-0.0039	0.0022	2	0.018	7.84
0.1 lb		-0.0009	n	-0.0009	0.0011	2	0.0091	7.84
0.05 lb		-0.00042	n	-0.00042	0.00054	2	0.0045	7.84
0.03 lb		-0.00106	n	-0.00106	0.00032	2	0.0027	7.84
0.02 lb		-0.00123	n	-0.00123	0.00022	2	0.0018	7.84
0.01 lb		-0.00026	n	-0.00026	0.00018	2	0.0015	7.84
0.005 lb		-0.00001	n	-0.00001	0.00014	2	0.0012	2.7
0.003 lb		-0.00042	n	-0.00042	0.00012	2	0.00099	2.7
0.002 lb		-0.00037	n	-0.00037	0.00011	2	0.00087	2.7
0.001 lb		-0.000204	n	-0.000204	0.000083	2	0.0007	2.7
0.001 lb	*	-0.000067	n	-0.000067	0.000083	2	0.0007	2.7
8 oz		0.0016	n	0.0016	0.0054	2	0.045	7.84
4 oz		-0.0031	n	-0.0031	0.0028	2	0.023	7.84
2 oz		0.0004	n	0.0004	0.0013	2	0.011	7.84
1 oz		0.00217	n	0.00217	0.00064	2	0.0054	7.84
1/2 oz		0.00172	n	0.00172	0.00034	2	0.0028	7.84
1/4 oz		0.00031	n	0.00031	0.00021	2	0.0017	7.84
1/8 oz		-0.00036	n	-0.00036	0.00016	2	0.0013	7.84
1/16 oz		-0.00018	n	-0.00018	0.00013	2	0.0011	7.84
1/16 oz	*	0.00061	n	0.00061	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



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Joel P. Lavicky *Metrologist*

8/12/2022
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.

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Director of Agriculture
Steve Wellman
P.O. Box 94947
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Calibration Certificate of Mass

Calibration Date: **August 8, 2022** | **Certificate Number:** **2022-111-3**

Submitted By: FSCP Area 80
3721 West Cuming St.
Lincoln, NE 68524

Point of Contact: Cody Matlock
Ph. 402-471-3422
email: *cody.matlock@nebrska.gov*
PO Number: N/A

Test Item(s): Metric Weight Kit
Serial Number(s): **WM-089-7**
Condition: Excellent (little wear)
Material: Stainless Steel

Artifact(s) Description:

Date Received: 8/8/2022
ID / Asset Number: **Area 80**
Class Specification: ASTM 4
Manufacture: Troemner

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

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

Equipment Used:
Sartorius CC 1201 Sartorius CCE6
Mettler XPR 205

Environmental Cond. **Temp:** 21.58 °C **Pressure:** 731.86 mmHg **Relative Humidity:** 51.97 %

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.

● **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.

Traceability Statement

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Uncertainty Statement

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www.nda.nebraska.gov

Calibration Date: August 8, 2022 | **Certificate Number:** 2022-111-3

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	ASTM 4 MPE ± (g)	Assumed Density (g/cm³)
300 g		0.00272	n	0.00272	0.00089	2	0.006	7.84
200 g		0.00199	n	0.00199	0.0006	2.004	0.004	7.84
100 g		0.00041	n	0.00041	0.00024	2.001	0.002	7.84
50 g		0.00024	n	0.00024	0.00015	2.003	0.0012	7.84
30 g		0.00016	n	0.00016	0.00011	2.003	0.0009	7.84
20 g		0.000401	n	0.000401	0.000094	2.003	0.0007	7.84
10 g		0.000442	n	0.000442	0.000063	2.009	0.0005	7.84
5 g		0.000285	n	0.000285	0.000045	2.001	0.00036	7.84
3 g		0.000291	n	0.000291	0.000038	2.001	0.0003	7.84
2 g		0.000098	n	0.000098	0.000033	2.001	0.00026	7.84
1 g		0.000030	n	0.000030	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

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Joel P. Lavicky *Metrologist*

8/12/2022
Date of Issue

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Director of Agriculture
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Lincoln, NE 68509-4947
(402) 471-2341
www.nda.nebraska.gov

Calibration Date: 8/9/2022

Certificate of Calibration of Volume Transfer

Certificate Number: 2022-111-4

Items Submitted:

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

Submitted By: FSCP Area 80
3721 West Cuming St.
Lincoln, NE 68524

POC: Cody Matlock
402-471-3422
cody.matlock@nebrska.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-B	SS	0.0000265	**4.9986 gal**	**4.9986 gal**	0.0013 gal	2.02
5 gal	4393-5-C	SS	0.0000265	**5.0007 gal**	**5.0007 gal**	0.0013 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:
Cleaned before Calibration

Procedure Used:
NISTIR 7383, SOP 19 (2019)

Environmental conditions at time of calibration:

Temp ˚C	23.2	Humidity %	46.2
Pressure mmHg	733.50		

Water temperature at time of calibration:
71.91 °F

Date Submitted: 8/8/2022

E-signature is copy only

Joel P. Lavicky, Metrologist

8/15/2022
Issue Date:

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Lincoln, NE 68509-4947
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www.nda.nebraska.gov

Calibration Date: 8/9/2022

Certificate of Calibration of Volume Transfer

Certificate Number: 2022-111-5

Items Submitted:

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

Submitted By: FSCP Area 80
3721 West Cuming St.
Lincoln, NE 68524

POC: Cody Matlock
402-471-3422
cody.matlock@nebrska.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	20-64572-10	304 SS	0.0000288	**5.00076 gal**	**5.00076 gal**	0.00082 gal	2.01
5 gal	20-64572-11	304 SS	0.0000288	**5.00034 gal**	**5.00034 gal**	0.00082 gal	2.01
5 gal	20-64572-12	304 SS	0.0000288	**5.00056 gal**	**5.00056 gal**	0.00082 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	23.3	Humidity %	47.6
Pressure mmHg	733.60		

Laboratory Reference Standard Used;
5 gal SP NE 1586

Procedure Used:
NISTIR 7383, SOP 19 (2019)

Water temperature at time of calibration:
72.19 °F

Date Submitted: 8/8/2022

E-signature is copy only

Joel P. Lavicky, Metrologist

8/15/2022
Issue Date:

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