

Agricultural Laboratory  
 6531 SE Forbes Ave, Suite B  
 Topeka, Kansas 66619  
 (785) 296-7020



Office of the Secretary  
 900 SW Jackson, Room 456  
 Topeka, Kansas 66612  
 (785) 296-3556

Jackie McClaskey, Secretary

Governor Sam Brownback

Test Date: 2/15/2016

## Kansas Metrology Laboratory Certificate of Calibration

Test No.: K15238-1.2



**Nebraska Department Of Agriculture  
 Food Safety & Consumer Protection  
 301 Centennial Mall South  
 Lincoln NE 68509**

Manufacturer: Troemner  
 S/N: WM-G89-5  
 Number of Pieces: 12 of 23 total

Nominal Mass	Weight's Markings	Assumed Density (g/cm <sup>3</sup> )	Conventional Mass As Found (g)	Conventional Mass As Left (g)	Expanded Uncertainty ± (mg)	In Tolerance Adjusted Rejected
500 mg	500 mg	7.84	0.4999455	0.4999455	0.0012	In Tolerance
200 mg	200 mg	7.84	0.20000526	0.20000526	0.00066	In Tolerance
200 mg	200 mg ●	7.84	0.19995945	0.19995945	0.00066	In Tolerance
100 mg	100 mg	7.84	0.09995502	0.09995502	0.00073	In Tolerance
50 mg	50	7.84	0.04999374	0.04999374	0.00042	In Tolerance
20 mg	20	2.7	0.02001844	0.02001844	0.00028	In Tolerance
20 mg	20 ●	2.7	0.01999185	0.01999185	0.00028	In Tolerance
10 mg	10	2.7	0.01000480	0.01000480	0.00039	In Tolerance
5 mg	5	2.7	0.00501144	0.00501144	0.00034	In Tolerance
2 mg	2	2.7	0.00198797	0.00198797	0.00031	In Tolerance
2 mg	2 ●	2.7	0.00199372	0.00199372	0.00031	In Tolerance
1 mg	1	2.7	0.00100052	0.00100052	0.00039	In Tolerance

This document certifies the above mentioned artifacts were compared to the Standards of the State of Kansas which are traceable to the National Institute of Standards and Technology. The conventional mass is the weight in normal air (1.2 mg/cm<sup>3</sup>) at 20 °C versus the reference density of 8.0 g/cm<sup>3</sup>. Calibration of listed items was performed according to NISTIR 6969, SOP 4 (Double Substitution) and/or NISTIR 5672, SOP 5 (3-1).

Tolerances were evaluated to ASTM Class 4. Surface finish and magnetism were not evaluated as it is assumed to be done by the manufacturer.



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Test Date: 2/15/2016

Test No.: K15238-1.1

## Kansas Metrology Laboratory Certificate of Calibration



**Nebraska Department Of Agriculture  
 Food Safety & Consumer Protection  
 301 Centennial Mall South  
 Lincoln NE 68509**

Manufacturer: Troemner  
 S/N: WM-G89-5  
 Number of Pieces: 11 of 23 total

Nominal Mass	Weight's Markings	Assumed Density (g/cm <sup>3</sup> )	Conventional Mass As Found (g)	Conventional Mass As Left (g)	Expanded Uncertainty ± (mg)	In Tolerance Adjusted Rejected
300 g	300g	7.84	300.002993	300.002993	0.098	In Tolerance
200 g	200g	7.84	200.001082	200.001082	0.093	In Tolerance
100 g	100g	7.84	100.000416	100.000416	0.018	In Tolerance
50 g	50g	7.84	50.000225	50.000225	0.011	In Tolerance
30 g	30g	7.84	29.9999536	29.9999536	0.0065	In Tolerance
20 g	20	7.84	20.0001330	20.0001330	0.0055	In Tolerance
10 g	10	7.84	10.0002551	10.0002551	0.0050	In Tolerance
5 g	5	7.84	5.0001001	5.0001001	0.0024	In Tolerance
3 g	3	7.84	3.0002661	3.0002661	0.0031	In Tolerance
2 g	2	7.84	2.0000907	2.0000907	0.0024	In Tolerance
1 g	1	7.84	1.0000499	1.0000499	0.0013	In Tolerance

This document certifies the above mentioned artifacts were compared to the Standards of the State of Kansas which are traceable to the National Institute of Standards and Technology. The conventional mass is the weight in normal air (1.2 mg/cm<sup>3</sup>) at 20 °C versus the reference density of 8.0 g/cm<sup>3</sup>. Calibration of listed items was performed according to NISTIR 6969, SOP 4 (Double Substitution) and/or NISTIR 5672, SOP 5 (3-1).

Tolerances were evaluated to ASTM Class 4. Surface finish and magnetism were not evaluated as it is assumed to be done by the manufacturer.

**Uncertainty Statement:**

The combined standard uncertainty includes the standard uncertainty reported for the standards, tare weights, the standard uncertainty for the measurement process, the standard uncertainty for air buoyancy corrections as stated in OIML R111-1 [2004E] eq. C.6.3-1, and a component of uncertainty to account for any observed deviations (Bias) from NIST (National Institute of Standards and Technology) values that are less than surveillance limits. Factors not considered in the evaluation: magnetism, weights are considered to meet magnetism specifications unless measurement aberrations are noted, balance eccentricity and linearity, these factors are considered as a part of the measurement assurance process when using a check standard with adequate degrees of freedom. The combined uncertainty is multiplied by the coverage factor (*k*-value) reported to give an expanded uncertainty, which defines an interval having a level of confidence of 95.45 percent. The coverage factor reported is based on the effective degrees of freedom as outlined in JCGM 100:2008 section G.4. The expanded uncertainty presented in this report is also consistent with and follows NISTIR 6969, SOP 29. The expanded uncertainty is not to be confused with a tolerance limit for the user during application.

**Uncertainty Analysis:**

Nominal	$S_p$	$u_{S(k=1)}$	$u_{tare(k=1)}$	$u_{Air\ Buoyancy\ Eq.}$	$\rho_{air}$	Procedure
300 g	0.0408	0.0172	No Tare	0.00196	1.14978	SOP 5
200 g	0.0408	0.0121	No Tare	0.00160	1.14835	SOP 5
100 g	0.00151	0.00907	No Tare	0.000838	1.14794	SOP 5
50 g	0.00238	0.00470	No Tare	0.000460	1.14910	SOP 5
30 g	0.00109	0.00302	No Tare	0.000264	1.14960	SOP 5
20 g	0.00158	0.00222	No Tare	0.000171	1.14989	SOP 5
10 g	0.00160	0.00183	No Tare	0.0000846	1.14998	SOP 5
5 g	0.000695	0.000970	No Tare	0.0000464	1.15003	SOP 5
3 g	0.00125	0.000650	No Tare	0.0000273	1.15025	SOP 5
2 g	0.00102	0.000495	No Tare	0.0000178	1.15050	SOP 5
1 g	0.000459	0.000455	No Tare	0.00000653	1.15311	SOP 5

All values listed as a component of the overall uncertainty are in units of milligrams (mg) or (mg/cm<sup>3</sup>).

**Traceability Statement:**

The Kansas Metrology Laboratory Standards are traceable to the SI through 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 laboratory test number identified above is the unique report number to be used in referencing measurement traceability for artifacts identified in this report only.

**Condition of Item(s) Submitted for Testing:** Minor wear.  
**Treatment of Item(s) before Testing:** Item(s) were tested as found.  
**Documentary Standards:** NIST Handbook 105 Series, NISTIR 6969, SOP 4, NISTIR 5672, SOP 5, & ASTM E 617-13 or OIML R111-1  
**Item(s) Received on:** 2/11/2016  
**Item(s) Acclimated:** 2/11/2016 3:51:00 PM

Environmental Conditions:	Temperature	Barometric Pressure	Relative Humidity
	20.2 °C	579.77 mmHg	46.1 %

Values are averages recorded over the duration of testing



**Keith Arkenberg, Metrologist**

2/17/2016

Date

KML Software Version: 8.3

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Jackie McClaskey, Secretary

Governor Sam Brownback

Test Date: 2/17/2016

## Kansas Metrology Laboratory Certificate of Calibration

Test No.: K15238-1.0



Nebraska Department Of Agriculture  
Food Safety & Consumer Protection  
P.O. Box 94757  
Lincoln NE 68509

Manufacturer: Troemner

S/N: WM-8

Number of Pieces: 1

Nominal Mass	Weight's Markings	Conventional Mass As Found / As Left (g)	Expanded Uncertainty ± (mg)	Assumed Density (g/cm <sup>3</sup> )	k-value	Tolerance (mg)	In Tolerance Adjusted Rejected
4 kg	WM-8 4 kg	4000.0592	3.7	7.84	2.17	80	In Tolerance

This document certifies the above mentioned artifacts were compared to the Standards of the State of Kansas which are traceable to the National Institute of Standards and Technology. The conventional mass is the weight in normal air (1.2 mg/cm<sup>3</sup>) at 20 °C versus the reference density of 8.0 g/cm<sup>3</sup> Calibration of listed items was performed according to NISTIR 6969, SOP 4 (Double Substitution) and/or NISTIR 5672, SOP 5 (3-1).

Tolerances were evaluated to ASTM Class 4. Surface finish and magnetism were not evaluated as it is assumed to be done by the manufacture.



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Jackie McClaskey, Secretary

Governor Sam Brownback

Expires on: 2/14/2017

## Kansas Metrology Laboratory Calibration Report

Report Number: K15238

Submitted on: 2/11/2016

Submitted by: Nebraska Department Of Agriculture Food Safety & Consumer Protection  
301 Centennial Mall South  
Lincoln, NE 68509

Vehicle Number: 60

Item(s)		
Tested	Adjusted	Rejected
59	3	0

  

Quantity	Nominal Mass	Type
20	25 lb	Weight(s)
2	15 lb	Weight(s)
25	2 lb to 1 lb, 8 oz to 1/16 oz	Weight(s)
12	0.3 lb to 0.001 lb	Weight(s)

The calibration of items is performed according to NISTIR 6969, SOP 8. Tolerances are applied from NISTHB 105-1.

Nominal Mass	Serial Number	Conventional Mass as Found	Tolerance ±	Expanded Uncertainty (U), (k=2), ±	Conventional Mass as Left	Adjusted/ In Tolerance/ Rejected
25 lb	WM25-105	<b>11340.65 g</b>	1.1 g	0.17 g	<b>11340.65 g</b>	In Tolerance
25 lb	WM25-107	<b>11340.37 g</b>	1.1 g	0.17 g	<b>11340.37 g</b>	In Tolerance
25 lb	WM25-108	<b>11340.72 g</b>	1.1 g	0.17 g	<b>11340.72 g</b>	In Tolerance
25 lb	WM25-109	<b>11340.83 g</b>	1.1 g	0.17 g	<b>11340.03 g</b>	<b>Adjusted</b>
25 lb	WM25-111	<b>11339.86 g</b>	1.1 g	0.17 g	<b>11339.86 g</b>	In Tolerance
25 lb	WM25-112	<b>11340.02 g</b>	1.1 g	0.17 g	<b>11340.02 g</b>	In Tolerance
25 lb	WM25-120	<b>11339.98 g</b>	1.1 g	0.17 g	<b>11339.98 g</b>	In Tolerance
25 lb	WM25-123	<b>11340.34 g</b>	1.1 g	0.17 g	<b>11340.34 g</b>	In Tolerance
25 lb	WM25-126	<b>11339.44 g</b>	1.1 g	0.17 g	<b>11339.44 g</b>	In Tolerance
25 lb	WM25-128	<b>11340.74 g</b>	1.1 g	0.17 g	<b>11340.74 g</b>	In Tolerance
25 lb	WM25-129	<b>11340.09 g</b>	1.1 g	0.17 g	<b>11340.09 g</b>	In Tolerance
25 lb	WM25-130	<b>11339.86 g</b>	1.1 g	0.17 g	<b>11339.86 g</b>	In Tolerance
25 lb	WM25-134	<b>11340.01 g</b>	1.1 g	0.17 g	<b>11340.01 g</b>	In Tolerance
25 lb	WM25-25	<b>11340.33 g</b>	1.1 g	0.17 g	<b>11340.33 g</b>	In Tolerance
25 lb	WM25-32	<b>11339.94 g</b>	1.1 g	0.17 g	<b>11339.94 g</b>	In Tolerance
25 lb	WM25-36	<b>11340.24 g</b>	1.1 g	0.17 g	<b>11340.24 g</b>	In Tolerance
25 lb	WM25-40	<b>11338.69 g</b>	1.1 g	0.17 g	<b>11339.80 g</b>	<b>Adjusted</b>
25 lb	WM25-51	<b>11339.30 g</b>	1.1 g	0.17 g	<b>11339.30 g</b>	In Tolerance
25 lb	WM25-52	<b>11340.08 g</b>	1.1 g	0.17 g	<b>11340.08 g</b>	In Tolerance
25 lb	WM25-53	<b>11340.65 g</b>	1.1 g	0.17 g	<b>11340.65 g</b>	In Tolerance

The data in the above table of this report only applies to those items specifically listed on this report.

453.59237 g = 1 lb  
28.349523125 g = 1 oz

The calibration of items is performed according to NISTIR 6969, SOP 8. Tolerances are applied from NISTHB 105-1.

Nominal Mass	Serial Number	Conventional Mass as Found	Tolerance ±	Expanded Uncertainty (U), (k=2), ±	Conventional Mass as Left	Adjusted/ In Tolerance/ Rejected
15 lb	WM15-15	<b>6803.872 g</b>	0.68 g	0.090 g	<b>6803.872 g</b>	In Tolerance
15 lb	WM15-16	<b>6803.882 g</b>	0.68 g	0.090 g	<b>6803.882 g</b>	In Tolerance

The data in the above table of this report only applies to those items specifically listed on this report.

453.59237 g = 1 lb  
28.349523125 g = 1 oz

The calibration of items is performed according to NISTIR 6969, SOP 8. Tolerances are applied from NISTHB 105-1.

Nominal Mass	Serial Number	Conventional Mass as Found	Tolerance $\pm$	Expanded Uncertainty (U), (k=2), $\pm$	Conventional Mass as Left	Adjusted/ In Tolerance/ Rejected
2 lb	14A9 1	<b>907.129 g</b>	0.091 g	0.011 g	<b>907.129 g</b>	In Tolerance
2 lb	14A9 2	<b>907.168 g</b>	0.091 g	0.011 g	<b>907.168 g</b>	In Tolerance
2 lb	14A9 3	<b>907.126 g</b>	0.091 g	0.011 g	<b>907.126 g</b>	In Tolerance
2 lb	14A9 4	<b>907.161 g</b>	0.091 g	0.011 g	<b>907.161 g</b>	In Tolerance
2 lb	14A9 5	<b>907.146 g</b>	0.091 g	0.011 g	<b>907.146 g</b>	In Tolerance
2 lb	14A9 6	<b>907.158 g</b>	0.091 g	0.011 g	<b>907.158 g</b>	In Tolerance
2 lb	14A9 7	<b>907.174 g</b>	0.091 g	0.011 g	<b>907.174 g</b>	In Tolerance
2 lb	14A9 8	<b>907.160 g</b>	0.091 g	0.011 g	<b>907.160 g</b>	In Tolerance
2 lb	14A9 9	<b>907.129 g</b>	0.091 g	0.011 g	<b>907.129 g</b>	In Tolerance
2 lb	14A9 10	<b>907.188 g</b>	0.091 g	0.011 g	<b>907.188 g</b>	In Tolerance
2 lb	14A9 11	<b>907.166 g</b>	0.091 g	0.011 g	<b>907.166 g</b>	In Tolerance
2 lb	14A9 12	<b>907.145 g</b>	0.091 g	0.011 g	<b>907.145 g</b>	In Tolerance
2 lb	14A9 13	<b>907.129 g</b>	0.091 g	0.011 g	<b>907.129 g</b>	In Tolerance
2 lb	14A9 14	<b>907.151 g</b>	0.091 g	0.011 g	<b>907.151 g</b>	In Tolerance
1 lb	14A9 15	<b>453.5759 g</b>	0.070 g	0.0084 g	<b>453.5759 g</b>	In Tolerance
1 lb	14A9 16	<b>453.5679 g</b>	0.070 g	0.0084 g	<b>453.5679 g</b>	In Tolerance
8 oz	14A9	<b>226.8105 g</b>	0.045 g	0.0053 g	<b>226.8105 g</b>	In Tolerance
4 oz	14A9	<b>113.4076 g</b>	0.023 g	0.0028 g	<b>113.4076 g</b>	In Tolerance
2 oz	14A9	<b>56.7089 g</b>	0.011 g	0.0013 g	<b>56.6984 g</b>	<b>Adjusted</b>
1 oz	14A9	<b>28.34947 g</b>	0.0054 g	0.00065 g	<b>28.34947 g</b>	In Tolerance
1/2 oz	14A9	<b>14.17461 g</b>	0.0028 g	0.00033 g	<b>14.17461 g</b>	In Tolerance
1/4 oz	14A9	<b>7.08823 g</b>	0.0017 g	0.00020 g	<b>7.08823 g</b>	In Tolerance
1/8 oz	14A9	<b>3.54307 g</b>	0.0013 g	0.00016 g	<b>3.54307 g</b>	In Tolerance
1/16 oz	14A9	<b>1.77237 g</b>	0.0011 g	0.00014 g	<b>1.77237 g</b>	In Tolerance
1/16 oz	14A9 •	<b>1.77250 g</b>	0.0011 g	0.00014 g	<b>1.77250 g</b>	In Tolerance

The data in the above table of this report only applies to those items specifically listed on this report.

453.59237 g = 1 lb

28.349523125 g = 1 oz

The calibration of items is performed according to NISTIR 6969, SOP 8. Tolerances are applied from NISTHB 105-1.

Nominal Mass	Serial Number	Conventional Mass as Found	Tolerance $\pm$	Expanded Uncertainty (U), (k=2), $\pm$	Conventional Mass as Left	Adjusted/ In Tolerance/ Rejected
0.3 lb	10OPI10A	<b>136.0694 g</b>	0.027 g	0.0032 g	<b>136.0694 g</b>	In Tolerance
0.2 lb	10OPI10A	<b>90.7155 g</b>	0.018 g	0.0021 g	<b>90.7155 g</b>	In Tolerance
0.1 lb	10OPI10A	<b>45.3569 g</b>	0.0091 g	0.0011 g	<b>45.3569 g</b>	In Tolerance
0.05 lb	10OPI10A	<b>22.68173 g</b>	0.0045 g	0.00055 g	<b>22.68173 g</b>	In Tolerance
0.03 lb	10OPI10A	<b>13.60662 g</b>	0.0027 g	0.00032 g	<b>13.60662 g</b>	In Tolerance
0.02 lb	10OPI10A	<b>9.07239 g</b>	0.0018 g	0.00022 g	<b>9.07239 g</b>	In Tolerance
0.01 lb	10OPI10A	<b>4.53521 g</b>	0.0015 g	0.00018 g	<b>4.53521 g</b>	In Tolerance
0.005 lb	10OPI10A	<b>2.26802 g</b>	0.0012 g	0.00015 g	<b>2.26802 g</b>	In Tolerance
0.003 lb	10OPI10A	<b>1.36015 g</b>	0.00099 g	0.00012 g	<b>1.36015 g</b>	In Tolerance
0.002 lb	10OPI10A	<b>0.90668 g</b>	0.00087 g	0.00011 g	<b>0.90668 g</b>	In Tolerance
0.001 lb	10OPI10A	<b>0.453812 g</b>	0.00070 g	0.000094 g	<b>0.453812 g</b>	In Tolerance
0.001 lb	10OPI10A •	<b>0.453402 g</b>	0.00070 g	0.000094 g	<b>0.453402 g</b>	In Tolerance

The data in the above table of this report only applies to those items specifically listed on this report.

453.59237 g = 1 lb

28.349523125 g = 1 oz

**Uncertainty Statement:**

The combined standard uncertainty includes the standard uncertainty reported for the standard, the standard uncertainty for the measurement process, the standard uncertainty for any uncorrected errors associated with buoyancy corrections (applies to mass values only), the standard uncertainty for any uncorrected errors associated with temperature correction (applies to length and volume values only), and a component of uncertainty to account for any observed deviations from NIST (The National Institute of Standards and Technology) values that are less than surveillance limits. The combined standard uncertainty is multiplied by a coverage factor of 2 to give an expanded uncertainty, which defines an interval having a level of confidence of approximately 95 percent. The expanded uncertainty presented in this report is consistent with the 1993 ISO Guide to the Expression of Uncertainty in Measurement and follows NISTIR 6969, SOP 29. The expanded uncertainty is not to be confused with a tolerance limit for the user during application.

**Traceability Statement:**

The Kansas Metrology Laboratory Standards are traceable to the SI through 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 laboratory test number identified above is the unique report number to be used in referencing measurement traceability for artifacts identified in this report only.

**Condition of Item(s) Submitted for Testing:**

Minor wear.

**Treatment of Item(s) before Testing:**

Item(s) were tested as found.

**Documentary Standards:**

NIST Handbook 105 Series  
NISTIR 6969: SOP 8, SOP 4, and/or SOP 7  
OR  
ASTM E 617-13 or OIML R 111-1 2004(E)

**Environmental Conditions:**

Temperature: 20.3 °C  
Barometric Pressure: 727.46 mmHg  
Relative Humidity: 45.0 %

Test Date: 2/15/2016

Due Date: 2/14/2017 -Per state statute K.S.A. 83-304(a).

*Kevin Uphoff*  
**Kevin Uphoff , Metrologist**

2/17/2016



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Jackie McClaskey, Secretary

Governor Sam Brownback

Expires on: 2/11/2017

## Kansas Metrology Laboratory Calibration Report

Report Number: K15238

Submitted on: 2/11/2016

Submitted by: Nebraska Department Of Agriculture Food Safety & Consumer Protection  
 301 Centennial Mall South  
 Lincoln, NE 68509

Reference Number: 60

Item(s)		
Tested	Adjusted	Rejected
5	0	0

  

Quantity	Nominal Volume	Type
2	5 gal	Handheld Test Measure "To Deliver"
3	5 gal	Bottom Drop Test Measure "To Deliver"

The calibration of items is performed according to NISTIR 7383, SOP 19 Volume Transfer. Tolerances are applied from NISTHB 105-3. The volume applies when a 10 second drain is observed for 5 gallon hand held test measures. For 5 gallon bottom drop test measures and provers a 30 second drain applies. The drain time starts when the cessation of the main flow is observed.

Nominal Volume	Serial Number	Material	Cubical Coefficient of Expansion (1/°F)	Volume as Found @ 60 °F	Tolerance ±	Expanded Uncertainty (U), (k=2.02), ±	Volume as Left @ 60 °F	Adjusted/ In Tolerance/ Rejected
5 gal	06-01161	Stainless Steel	0.0000265	<b>5.00058 gal</b>	0.00250 gal	0.00084 gal	<b>5.00058 gal</b>	In Tolerance
5 gal	06-01165	Stainless Steel	0.0000265	<b>4.99971 gal</b>	0.00250 gal	0.00084 gal	<b>4.99971 gal</b>	In Tolerance
5 gal	05-41609-15	Stainless Steel	0.0000265	<b>5.00032 gal</b>	0.00250 gal	0.00085 gal	<b>5.00032 gal</b>	In Tolerance
5 gal	05-41610-03	Stainless Steel	0.0000265	<b>4.99913 gal</b>	0.00250 gal	0.00084 gal	<b>4.99913 gal</b>	In Tolerance
5 gal	05-41610-08	Stainless Steel	0.0000265	<b>5.00151 gal</b>	0.00250 gal	0.00085 gal	<b>5.00151 gal</b>	In Tolerance

The data in the above table of this report only applies to those items specifically listed on this report.

1 m³=1 000 L=264.1720 gal

## Temperature Corrections

Item	Temperature °F	in <sup>3</sup>
Temperature Correction for 5 gal Stainless Steel Test Measure (CCE= 0.0000265/°F)	-20	-2.45
	-15	-2.30
	-10	-2.14
	-5	-1.99
	0	-1.84
	5	-1.68
	10	-1.53
	15	-1.38
	20	-1.22
	25	-1.07
	30	-0.92
	35	-0.77
	40	-0.61
	45	-0.46
	50	-0.31
	55	-0.15
	60	0.00
	65	0.15
	70	0.31
	75	0.46
	80	0.61
85	0.77	
90	0.92	
95	1.07	
100	1.22	
105	1.38	
110	1.53	
115	1.68	
120	1.84	

Item	Temperature °F	in <sup>3</sup>
Temperature Correction for 5 gal Low Carbon Steel Test Measure (CCE= 0.0000186/°F)	-20	-1.72
	-15	-1.61
	-10	-1.50
	-5	-1.40
	0	-1.29
	5	-1.18
	10	-1.07
	15	-0.97
	20	-0.86
	25	-0.75
	30	-0.64
	35	-0.54
	40	-0.43
	45	-0.32
	50	-0.21
	55	-0.11
	60	0.00
	65	0.11
	70	0.21
	75	0.32
	80	0.43
85	0.54	
90	0.64	
95	0.75	
100	0.86	
105	0.97	
110	1.07	
115	1.18	
120	1.29	

CCE = Coefficient of Cubical Expansion

Expires on: 2/11/2017

# Kansas Metrology Laboratory

Report Number: K15238

## Uncertainty Statement:

The combined standard uncertainty includes the standard uncertainty reported for the standards, the standard uncertainty for the measurement process, the standard uncertainty for the water density equation (Metrologia Tanaka, et al), the standard uncertainty for any uncorrected errors associated with temperature correction (applies to length and volume values only), the standard uncertainty for reading the meniscus (when applicable), the standard uncertainty for viscosity, and a component of uncertainty to account for any observed deviations from NIST(The National Institute of Standards and Technology) values that are less than surveillance limits. The combined standard uncertainty is multiplied by the coverage factor (k-value) reported to give an expanded uncertainty, which defines an interval having a level of confidence of 95.45 percent. The k-value reported is based on the effective degrees of freedom as outlined in JCGM 100:2008 section G.4. The expanded uncertainty presented in this report is consistent with the 1993 ISO Guide to the Expression of Uncertainty in Measurement and follows NISTIR 6969, SOP 29. The expanded uncertainty is not to be confused with a tolerance limit for the user during application.

## Traceability Statement:

The Kansas Metrology Laboratory Standards are traceable to the SI through 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 laboratory test number identified above is the unique report number to be used in referencing measurement traceability for artifacts identified in this report only.

## Condition of Item(s) Submitted for Testing:

Minor wear.

## Treatment of Item(s) before Testing:

Item(s) were tested as found.

## Water Temperature at Time of Test:

70.68 °F

## Documentary Standards:

-NIST Handbook 105-3 (2010)

-NISTIR 7383 (2013), SOP 19

## Environmental Conditions:

Temperature:	21.76 °C
Barometric Pressure:	744.86 mmHg
Relative Humidity:	23.8 %

Test Date: 2/12/2016

Due Date: 2/11/2017 -Per state statute K.S.A. 83-304(a).

  
Kevin Uphoff, Metrologist

2/17/2016



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