

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: 10/27/2015

Kansas Metrology Laboratory Certificate of Calibration

Test No.: K15145-3.2



**NEBRASKA DEPARTMENT OF AGRICULTURE
 FOOD SAFETY & CONSUMER PROTECTION
 PO BOX 94757
 LINCOLN NE 68509**

Manufacturer: Troemner
 S/N: WM-G89-4
 Number of Pieces: 12 of 23 total

Nominal Mass	Weight's Markings	Assumed Density (g/cm ³)	Conventional Mass As Found (g)	Conventional Mass As Left (g)	Expanded Uncertainty ± (mg)	In Tolerance Adjusted Rejected
500 mg	500 mg	7.84	0.5000223	0.5000223	0.0013	In Tolerance
200 mg	200 mg	7.84	0.19999049	0.19999049	0.00068	In Tolerance
200 mg	200 mg ●	7.84	0.20001226	0.20001226	0.00068	In Tolerance
100 mg	100 mg	7.84	0.09997811	0.09997811	0.00075	In Tolerance
50 mg	50	7.84	0.04999112	0.04999112	0.00047	In Tolerance
20 mg	20	2.7	0.01997780	0.01997780	0.00028	In Tolerance
20 mg	20 ●	2.7	0.02001519	0.02001519	0.00028	In Tolerance
10 mg	10	2.7	0.01000619	0.01000619	0.00035	In Tolerance
5 mg	5	2.7	0.00501450	0.00501450	0.00026	In Tolerance
2 mg	2	2.7	0.00200363	0.00200363	0.00023	In Tolerance
2 mg	2 ●	2.7	0.00200653	0.00200653	0.00023	In Tolerance
1 mg	1	2.7	0.00100083	0.00100083	0.00042	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/cm³) at 20 °C versus the reference density of 8.0 g/cm³. 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	$u_{S(k=1)}$	$u_{tare(k=1)}$	$u_{Air\ Buoyancy\ Eq.}$	ρ_{air}	Procedure
500 mg	0.000561	0.000255	No Tare	0.0000206	1.16131	SOP 5
200 mg	0.000293	0.000150	No Tare	0.00000823	1.16109	SOP 5
200 mg	0.000293	0.000150	No Tare	0.00000823	1.16103	SOP 5
100 mg	0.000334	0.000150	No Tare	0.00000425	1.14844	SOP 5
50 mg	0.000199	0.0000950	No Tare	0.00000213	1.14811	SOP 5
20 mg	0.000114	0.0000650	No Tare	0.0000217	1.14793	SOP 5
20 mg	0.000114	0.0000650	No Tare	0.0000217	1.14778	SOP 5
10 mg	0.000158	0.0000700	No Tare	0.0000109	1.14749	SOP 5
5 mg	0.000104	0.0000550	No Tare	0.00000546	1.14745	SOP 5
2 mg	0.0000948	0.0000550	No Tare	0.00000219	1.14743	SOP 5
2 mg	0.0000948	0.0000550	No Tare	0.00000219	1.14740	SOP 5
1 mg	0.000189	0.0000650	No Tare	0.00000109	1.14739	SOP 5

All values listed as a component of the overall uncertainty are in units of milligrams (mg) or (mg/cm³).

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: 10/13/2015
Item(s) Acclimated: 10/14/2015 8:58:00 AM

Environmental Conditions:	Temperature	Barometric Pressure	Relative Humidity
	20.3 °C	731.99 mmHg	43.3 %

Values are averages recorded over the duration of testing



Keith Arkenberg, Metrologist

10/28/2015
Date

KML Software Version: 8.3

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Jackie McClaskey, Secretary

Governor Sam Brownback

Test Date: 10/15/2015

Kansas Metrology Laboratory Certificate of Calibration

Test No.: K15145-3.1



**NEBRASKA DEPARTMENT OF AGRICULTURE
 FOOD SAFETY & CONSUMER PROTECTION
 PO BOX 94757
 LINCOLN NE 68509**

Manufacturer: Troemner
 S/N: WM-G89-4
 Number of Pieces: 11 of 23 total

Nominal Mass	Weight's Markings	Assumed Density (g/cm ³)	Conventional Mass As Found (g)	Conventional Mass As Left (g)	Expanded Uncertainty ± (mg)	In Tolerance Adjusted Rejected
300 g	300g	7.84	299.999680	299.999680	0.081	In Tolerance
200 g	200g	7.84	200.003243	200.003243	0.098	In Tolerance
100 g	100g	7.84	100.000398	100.000398	0.024	In Tolerance
50 g	50g	7.84	50.001057	50.001057	0.017	In Tolerance
30 g	30g	7.84	30.000159	30.000159	0.019	In Tolerance
20 g	20	7.84	20.0005450	20.0005450	0.0072	In Tolerance
10 g	10	7.84	10.0000648	10.0000648	0.0066	In Tolerance
5 g	5	7.84	5.0001838	5.0001838	0.0046	In Tolerance
3 g	3	7.84	2.9999719	2.9999719	0.0042	In Tolerance
2 g	2	7.84	2.0000549	2.0000549	0.0031	In Tolerance
1 g	1	7.84	0.9999970	0.9999970	0.0014	In Tolerance

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Uncertainty Analysis:

Nominal	S_p	$u_{S (k=1)}$	$u_{tare (k=1)}$	$u_{Air Buoyancy Eq.}$	ρ_{air}	Procedure
300 g	0.0310	0.0172	No Tare	-0.00289	1.16337	SOP 5
200 g	0.0411	0.0121	No Tare	-0.00180	1.16150	SOP 5
100 g	0.00818	0.00907	No Tare	-0.000888	1.16118	SOP 5
50 g	0.00667	0.00470	No Tare	-0.000370	1.16126	SOP 5
30 g	0.00831	0.00302	No Tare	-0.000220	1.16112	SOP 5
20 g	0.00280	0.00222	No Tare	-0.000145	1.16094	SOP 5
10 g	0.00273	0.00183	No Tare	-0.0000926	1.16643	SOP 5
5 g	0.00201	0.000970	No Tare	-0.0000395	1.16401	SOP 5
3 g	0.00175	0.000650	No Tare	-0.0000257	1.16593	SOP 5
2 g	0.00142	0.000495	No Tare	-0.0000173	1.16628	SOP 5
1 g	0.000515	0.000455	No Tare	-0.00000683	1.16171	SOP 5

All values listed as a component of the overall uncertainty are in units of milligrams (mg) or (mg/cm³).

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Item(s) Received on: 10/13/2015
Item(s) Acclimated: 10/14/2015 8:58:00 AM

Environmental Conditions:	Temperature	Barometric Pressure	Relative Humidity
	20.1 °C	736.49 mmHg	41.4 %

Values are averages recorded over the duration of testing



Keith Arkenberg, Metrologist

10/28/2015
Date

KML Software Version: 8.3

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