



**Calibration Certificate**

**Certificate Number:** 19-986

**Calibration Date:** 05/29/2019

**Calibration Due Date:** 05/29/2020

**Tested Item(s):** 50 lb, 25 lb, and 25 kg Test Weights

**Issued To:** Koenig Scale Company Inc  
 4779 E Margaret Dr  
 Terre Haute, IN 47803

**POC:** Jim Maxwell

**Phone:** 812-877-6121

**Authorizing Calibration:** Kevin Koenig

**Date Received:** 05/29/2019

**Artifact(s) Description**

**Test Item(s):** 50 lb, 25 lb, and 25 kg Test Weights

**Serial No:** Various

**Manufacture:** Various

**Material:** Cast Iron

**Class Specification:** NIST HB 105-1 (1990), Class F

**Condition:** Good

**Calibration Information**

**Metrologist:** Howard Wickersham

**Procedure:** NIST SOP 8: Modified Substitution (3/2018)

**Temperature:** 22.9 °C

**Pressure:** 732.2 mm Hg

**Humidity:** 50.4 % RH

**Summary Table**

Nominal Mass	Serial No. / ID	Manufacture	Correct	Adjusted	Condemned	Confiscated	Total
50 lb	Various	Various	58	2	0	0	60
25 kg	Various	Rice Lake	30	0	0	0	30
25 lb	Various	Rice Lake	8	0	0	0	8
20 kg	1-IRA	Rice Lake	1	0	0	0	1
10 kg	1247-11	Rice Lake	1	0	0	0	1
<b>Grand Total</b>			<b>98</b>	<b>2</b>	<b>0</b>	<b>0</b>	<b>100</b>

**Calibration Results**

Nominal Mass	Serial No. / ID	Manufacture	Conventional Mass Correction		U ± (g)	k factor	Degrees of Freedom	NIST HB 105-1 (1990), Class F MPE ± (g)	Assumed Density (g/cm³)
			As Found (g)	As Left (g)					
50 lb	1029	Tromner	-0.95	-0.95	0.3	2.025	69	2.3	7
50 lb	1013	Toledo	-0.02	-0.02	0.3	2.025	69	2.3	7
50 lb	1023	Fairbanks	-0.14	-0.14	0.3	2.025	69	2.3	7
50 lb	1020	Rice Lake	1.44	1.44	0.3	2.025	69	2.3	7
50 lb	1035	Tromner	-1.33	-1.33	0.3	2.025	69	2.3	7
50 lb	1032	Tromner	0.44	0.44	0.3	2.025	69	2.3	7
50 lb	1025	Tromner	1.02	1.02	0.3	2.025	69	2.3	7



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50 lb	1018	Toledo	0.15	0.15	0.3	2.025	69	2.3	7
50 lb	1009	Rice Lake	-1.06	-1.06	0.3	2.025	69	2.3	7
50 lb	1008	Toledo	1.46	1.46	0.3	2.025	69	2.3	7
50 lb	1027	Tromner	-0.7	-0.7	0.31	2.05	69	2.3	7
50 lb	906	Tromner	-0.18	-0.18	0.31	2.05	69	2.3	7
50 lb	1017	Toledo	-0.47	-0.47	0.31	2.05	69	2.3	7
50 lb	1031	Tromner	0.03	0.03	0.31	2.05	69	2.3	7
50 lb	1003	Tromner	0.35	0.35	0.31	2.05	69	2.3	7
50 lb	1016	Tromner	-1.24	-1.24	0.31	2.05	69	2.3	7
50 lb	1004	Tromner	<b>-2.08</b>	<b>-0.66</b>	0.31	2.05	69	2.3	7
50 lb	910	Toledo	-0.68	-0.68	0.31	2.05	69	2.3	7
50 lb	903	Toledo	-0.8	-0.8	0.31	2.05	69	2.3	7
50 lb	902	Toledo	<b>-2.03</b>	<b>-1.98</b>	0.31	2.05	69	2.3	7
50 lb	1010	Rice Lake	-0.76	-0.76	0.31	2.05	69	2.3	7
50 lb	619	Toledo	-0.15	-0.15	0.31	2.05	69	2.3	7
50 lb	905	Toledo	1.19	1.19	0.31	2.05	69	2.3	7
50 lb	1022	Toledo	0.58	0.58	0.31	2.05	69	2.3	7
50 lb	904	Toledo	0.29	0.29	0.31	2.05	69	2.3	7
50 lb	909	Toledo	-0.31	-0.31	0.31	2.05	69	2.3	7
50 lb	907	Toledo	-1.34	-1.34	0.31	2.05	69	2.3	7
50 lb	1000	Toledo	-0.44	-0.44	0.31	2.05	69	2.3	7
50 lb	1012	Toledo	-0.83	-0.83	0.31	2.05	69	2.3	7
50 lb	908	Toledo	0.25	0.25	0.31	2.05	69	2.3	7
50 lb	209	Rice Lake	-0.69	-0.69	0.31	2.05	69	2.3	7
50 lb	607	Rice Lake	-0.04	-0.04	0.31	2.05	69	2.3	7
50 lb	208	Rice Lake	0.43	0.43	0.31	2.05	69	2.3	7
50 lb	609	Toledo	0.37	0.37	0.31	2.05	69	2.3	7
50 lb	702	Rice Lake	0.61	0.61	0.31	2.05	69	2.3	7
50 lb	605	Rice Lake	-1.19	-1.19	0.31	2.05	69	2.3	7
50 lb	716	Rice Lake	0.64	0.64	0.31	2.05	69	2.3	7
50 lb	608	Rice Lake	0.36	0.36	0.31	2.05	69	2.3	7
50 lb	713	Rice Lake	0.16	0.16	0.31	2.05	69	2.3	7
50 lb	709	Rice Lake	0.39	0.39	0.31	2.05	69	2.3	7
50 lb	715	Rice Lake	-0.53	-0.53	0.31	2.05	69	2.3	7
50 lb	714	Rice Lake	1.37	1.37	0.31	2.05	69	2.3	7
50 lb	711	Rice Lake	-0.11	-0.11	0.31	2.05	69	2.3	7
50 lb	603	Rice Lake	-1.34	-1.34	0.31	2.05	69	2.3	7
50 lb	700	Rice Lake	-0.82	-0.82	0.31	2.05	69	2.3	7
50 lb	719	Rice Lake	0.84	0.84	0.31	2.05	69	2.3	7
50 lb	706	Rice Lake	-1.05	-1.05	0.31	2.05	69	2.3	7
50 lb	610	Rice Lake	-0.61	-0.61	0.31	2.05	69	2.3	7
50 lb	201	Rice Lake	1.44	1.44	0.31	2.05	69	2.3	7
50 lb	204	Rice Lake	0.49	0.49	0.31	2.05	69	2.3	7
50 lb	712	Rice Lake	0.83	0.83	0.31	2.05	69	2.3	7



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50 lb	618	Toledo	0.69	0.69	0.31	2.05	69	2.3	7
50 lb	616	Toledo	0.47	0.47	0.31	2.05	69	2.3	7
50 lb	615	Toledo	-0.18	-0.18	0.31	2.05	69	2.3	7
50 lb	611	Toledo	0.88	0.88	0.31	2.05	69	2.3	7
50 lb	612	Toledo	1.25	1.25	0.31	2.05	69	2.3	7
50 lb	704	Rice Lake	-1.88	-1.88	0.31	2.05	69	2.3	7
50 lb	620	Toledo	0.62	0.62	0.31	2.05	69	2.3	7
50 lb	705	Rice Lake	-0.72	-0.72	0.31	2.05	69	2.3	7
50 lb	710	Rice Lake	0.2	0.2	0.31	2.05	69	2.3	7
25 kg	30	Rice Lake	-0.47	-0.47	0.32	2.21	13	2.5	7
25 kg	22	Rice Lake	-0.44	-0.44	0.32	2.21	13	2.5	7
25 kg	23	Rice Lake	1.02	1.02	0.32	2.21	13	2.5	7
25 kg	25	Rice Lake	1.57	1.57	0.32	2.21	13	2.5	7
25 kg	5	Rice Lake	0.22	0.22	0.32	2.21	13	2.5	7
25 kg	13	Rice Lake	-1.26	-1.26	0.32	2.21	13	2.5	7
25 kg	8	Rice Lake	0.86	0.86	0.32	2.21	13	2.5	7
25 kg	14	Rice Lake	0.52	0.52	0.32	2.21	13	2.5	7
25 kg	39	Rice Lake	-1.21	-1.21	0.32	2.21	13	2.5	7
25 kg	20	Rice Lake	-0.93	-0.93	0.32	2.21	13	2.5	7
25 kg	24	Rice Lake	0.57	0.57	0.32	2.21	13	2.5	7
25 kg	29	Rice Lake	0.15	0.15	0.32	2.21	13	2.5	7
25 kg	26	Rice Lake	0.35	0.35	0.32	2.21	13	2.5	7
25 kg	2	Rice Lake	-0.47	-0.47	0.32	2.21	13	2.5	7
25 kg	40	Rice Lake	0.42	0.42	0.32	2.21	13	2.5	7
25 kg	6	Rice Lake	0.03	0.03	0.32	2.21	13	2.5	7
25 kg	3	Rice Lake	0.26	0.26	0.32	2.21	13	2.5	7
25 kg	21	Rice Lake	0.62	0.62	0.32	2.21	13	2.5	7
25 kg	10	Rice Lake	-0.92	-0.92	0.32	2.21	13	2.5	7
25 kg	15	Rice Lake	-1.36	-1.36	0.32	2.21	13	2.5	7
25 kg	31	Rice Lake	-1.74	-1.74	0.32	2.21	13	2.5	7
25 kg	34	Rice Lake	0.16	0.16	0.32	2.21	13	2.5	7
25 kg	11	Rice Lake	-0.12	-0.12	0.32	2.21	13	2.5	7
25 kg	7	Rice Lake	-1.24	-1.24	0.32	2.21	13	2.5	7
25 kg	16	Rice Lake	-0.51	-0.51	0.32	2.21	13	2.5	7
25 kg	33	Rice Lake	-0.05	-0.05	0.32	2.21	13	2.5	7
25 kg	35	Rice Lake	1.8	1.8	0.32	2.21	13	2.5	7
25 kg	18	Rice Lake	-0.08	-0.08	0.32	2.21	13	2.5	7
25 kg	27	Rice Lake	-0.92	-0.92	0.32	2.21	13	2.5	7
25 kg	28	Rice Lake	-0.26	-0.26	0.32	2.21	13	2.5	7
25 lb	2530	Rice Lake	-0.16	-0.16	0.2	2.006	398	1.1	7
25 lb	111	Rice Lake	-0.19	-0.19	0.2	2.006	398	1.1	7
25 lb	2505	Rice Lake	0.7	0.7	0.2	2.006	398	1.1	7
25 lb	411	Rice Lake	-0.21	-0.21	0.2	2.006	398	1.1	7
25 lb	2526	Rice Lake	0.5	0.5	0.2	2.006	398	1.1	7



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25 lb	2515	Rice Lake	0.46	0.46	0.2	2.006	398	1.1	7
25 lb	2510	Rice Lake	0.5	0.5	0.2	2.006	398	1.1	7
25 lb	2527	Rice Lake	0.01	0.01	0.2	2.006	398	1.1	7
20 kg	1-IRA	Rice Lake	0.47	0.47	0.28	2.25	11	2	7
10 kg	1247-11	Rice Lake	0.19	0.19	0.26	4.5	2	1	7



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**Traceability Statement**

The artifact(s) described in this calibration certificate have been compared to the Standards of the State of Indiana. The Standards of the State of Indiana are traceable to 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 International System of Units (SI) for mass is the kilogram (kg) (see Conversion Factors below). The certificate number for this calibration is the only unique number to be used in referencing measurement traceability for the artifact(s) described in this calibration 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 (previous similar determinations have demonstrated that the maximum permissible errors are sufficiently large that buoyancy corrections are not usually significant [i.e., corrections & their uncertainty will not change the last decimal place of the calibration value or uncertainty (with uncertainty rounded to 2 significant digits)]. The combined standard uncertainty is multiplied by a coverage factor,  $k$ , to give the expanded uncertainty, which defines an interval with an approximate 95 % level of confidence. The expanded uncertainty presented in this calibration certificate is consistent with NIST Technical Note 1297. Surface Roughness and Magnetic testing has not been performed, therefore, there are no components for the effects of either in the uncertainty budget.

**Conformity Statement**

This artifact was evaluated using the NIST Handbook 105-1 "Specifications & Tolerances for Reference and Field Weights", (Feb 2017); NISTIR 6969 "Selected Procedures to Support Basic Mass Calibrations" (2018 Ed), Section SOP 8 "Calibration of Mass Standards by Modified Substitution (June 2008). No other specifications were evaluated on this certificate other than what is listed. Possession of this certificate does imply this artifact meets any other requirements **or statues that may be required.**

**Pertinent Information**

- In-accordance-with ISO/IEC FDIS 17025, General Requirements for the Competence of Testing and Calibration Laboratories, paragraph 5.10.4.4 'A calibration certificate (or calibration label) shall not contain any recommendation on the calibration interval except where this has been agreed with the client. This requirement may be superseded by legal regulations.'
- In-accordance-with Indiana Code (IC) 24-6-3-2, Division of weights and measures; powers and duties, Section 2(b), '...The division, or inspectors at the divisions direction, shall correct the standards of the several cities and counties, and as often as once in two (2) years compare the same with those in the division's possession, and where not otherwise provided by law the division shall have the general supervision of the weights, measures, and measuring and weighing devices in use in Indiana...'
- 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. **BOLD** print indicates an out-of-compliance reading.



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- All corrections stated in this calibration certificate correlate to a "Conventional Mass" (CM), also known as 'apparent mass', scale versus  $8.0 \text{ g/cm}^3$  reference mass density and an air density of  $1.2 \text{ mg/cm}^3$  at  $20 \text{ }^\circ\text{C}$ .
- The results listed in this calibration certificate relate only to the artifacts described and extent of calibrations performed.



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**Conversion Factors**

From NIST Special Publication 811, *Guide for the Use of the International System of Units (SI)*  
Factors in **boldface** are exact

To convert from	to	multiply by
carat, metric	to kilogram (kg)	<b>2.0 E-04</b>
grain (gr)	to kilogram (kg)	<b>6.479 891 E-05</b>
ounce (avoirdupois) (oz)	to kilogram (kg)	2.834 952 E-02
ounce (troy or apothecary) (oz)	to kilogram (kg)	3.110 348 E-02
dram (apothecary) (dr)	to kilogram (kg)	3.8879346 E-03
scruple (apothecary) (s)	to kilogram (kg)	1.2959782 E-03
pennyweight (dwt)	to kilogram (kg)	1.555 174 E-03
pound (avoirdupois) (lb)	to kilogram (kg)	<b>4.535 923 7 E-01</b>

I declare or certify under penalty of perjury under the laws of the State of Indiana that the foregoing is true and correct:

Signed on this 29th day of May, 2019 in the city of Indianapolis, Marion County, Indiana

**Signature:** Howard Wickersham

Howard Wickersham, State Metrologist, Technical Manager