



Calibration Certificate

Certificate Number: 19-997

Calibration Date: May 28 2019

Calibration Due Date: May 28 2020

Tested Item(s): 25 kg, 250 kg, 50 lb Test Weights

Issued To: Koening Scale Company Inc
4779 E Margaret St

POC: Kevin Koening
Phone: 812-877-4364

Authorizing Calibration: Kevin Koening

Date Received: 5/26/2019

Artifact(s) Description

Test Item(s): 25 kg, 250 kg & 50 lb

Serial No: Various

Manufacture: Rice Lake, Tromner,

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 (2015)

Temperature: 22.8 °C

Pressure: 732.6 mm Hg

Humidity: 51.2 % RH

Summary Table

Nominal Mass	Serial No. / ID	Manufacture	Correct	Adjusted	Condemned	Confiscated	Total
25 kg	Various	Rice Lake	10	0	0	0	10
50 lb	Various	Rice Lake, Tromner	56	1	0	0	57
250 kg	Various	Rice Lake	6	0	0	0	6
25 lb	Various	Rice Lake	3	0	0	0	3
Grand Total			75	1	0	0	76

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	604	Rice Lake	-1.1	-1.1	0.3	2.025	69	2.3	7
50 lb	602	Rice Lake	-1.28	-1.28	0.3	2.025	69	2.3	7
50 lb	606	Rice Lake	-0.39	-0.39	0.3	2.025	69	2.3	7
50 lb	205	Rice Lake	0.69	0.69	0.3	2.025	69	2.3	7
50 lb	210	Rice Lake	1.72	1.72	0.3	2.025	69	2.3	7
50 lb	203	Rice Lake	0.38	0.38	0.3	2.025	69	2.3	7
50 lb	207	Rice Lake	0.34	0.34	0.3	2.025	69	2.3	7
50 lb	202	Rice Lake	0.66	0.66	0.3	2.025	69	2.3	7
50 lb	601	Rice Lake	-0.32	-0.32	0.3	2.025	69	2.3	7



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50 lb	206	Rice Lake	-1.06	-1.06	0.3	2.025	69	2.3	7
50 lb	617	Rice lake	0.98	0.98	0.31	2.05	69	2.3	7
50 lb	613	Rice lake	0.12	0.12	0.31	2.05	69	2.3	7
50 lb	803	Rice lake	-0.14	-0.14	0.31	2.05	69	2.3	7
50 lb	810	Rice lake	0.32	0.32	0.31	2.05	69	2.3	7
50 lb	804	Rice lake	0.18	0.18	0.31	2.05	69	2.3	7
50 lb	401	Rice lake	-0.17	-0.17	0.31	2.05	69	2.3	7
50 lb	807	Rice lake	1	1	0.31	2.05	69	2.3	7
50 lb	806	Rice lake	-0.18	-0.18	0.31	2.05	69	2.3	7
50 lb	805	Rice lake	0.67	0.67	0.31	2.05	69	2.3	7
50 lb	801	Rice lake	0.44	0.44	0.31	2.05	69	2.3	7
50 lb	402	Rice Lake	1.08	1.08	0.31	2.05	69	2.3	7
50 lb	406	Rice Lake	-0.29	-0.29	0.31	2.05	69	2.3	7
50 lb	408	Rice Lake	-0.12	-0.12	0.31	2.05	69	2.3	7
50 lb	404	Rice Lake	1.68	1.68	0.31	2.05	69	2.3	7
50 lb	409	Rice Lake	-0.2	-0.2	0.31	2.05	69	2.3	7
50 lb	410	Rice Lake	-0.05	-0.05	0.31	2.05	69	2.3	7
50 lb	403	Rice Lake	-0.02	-0.02	0.31	2.05	69	2.3	7
50 lb	405	Rice Lake	-0.59	-0.59	0.31	2.05	69	2.3	7
50 lb	407	Rice Lake	0.42	0.42	0.31	2.05	69	2.3	7
50 lb	1007	Toledo	1.18	1.18	0.31	2.05	69	2.3	7
50 lb	1015	Toledo	0.28	0.28	0.31	2.05	69	2.3	7
50 lb	1014	Toledo	0.17	0.17	0.31	2.05	69	2.3	7
50 lb	1006	Toledo	2.11	0.77	0.31	2.05	69	2.3	7
50 lb	1005	Toledo	-1.31	-1.31	0.31	2.05	69	2.3	7
50 lb	1011	Toledo	-0.24	-0.24	0.31	2.05	69	2.3	7
50 lb	1002	Toledo	0.73	0.73	0.31	2.05	69	2.3	7
50 lb	1019	Tromner	-0.69	-0.69	0.31	2.05	69	2.3	7
50 lb	1036	Rice lake	0.65	0.65	0.31	2.05	69	2.3	7
50 lb	614	Tromner	-0.04	-0.04	0.31	2.05	69	2.3	7
50 lb	802	Rice Lake	-0.92	-0.92	0.31	2.05	69	2.3	7
50 lb	808	Rice Lake	-0.62	-0.62	0.31	2.05	69	2.3	7
50 lb	701	Rice Lake	-0.14	-0.14	0.31	2.05	69	2.3	7
50 lb	708	Rice Lake	-0.07	-0.07	0.31	2.05	69	2.3	7
50 lb	809	Rice Lake	-0.54	-0.54	0.31	2.05	69	2.3	7
50 lb	901	Rice Lake	-0.57	-0.57	0.31	2.05	69	2.3	7
50 lb	1001	Rice Lake	-0.49	-0.49	0.31	2.05	69	2.3	7
50 lb	1016	Toledo	-1.24	-1.24	0.31	2.05	69	2.3	7
50 lb	1021	Rice Lake	-0.11	-0.11	0.31	2.05	69	2.3	7
50 lb	1024	Rice Lake	0.13	0.13	0.31	2.05	69	2.3	7
50 lb	1026	Tromner	-0.48	-0.48	0.31	2.05	69	2.3	7
50 lb	1028	Tromner	-0.29	-0.29	0.31	2.05	69	2.3	7
50 lb	1030	Tromner	1.55	1.55	0.31	2.05	69	2.3	7
50 lb	1033	Tromner	-0.63	-0.63	0.31	2.05	69	2.3	7



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50 lb	1034	Tromner	-0.11	-0.11	0.31	2.05	69	2.3	7
50 lb	1037	Rice Lake	-1.61	-1.61	0.31	2.05	69	2.3	7
50 lb	1010T	Rice Lake	-0.36	-0.36	0.31	2.05	69	2.3	7
25 kg	32	Rice Lake	-0.59	-0.59	0.32	2.21	13	2.5	7
25 kg	17	Rice Lake	0.69	0.69	0.32	2.21	13	2.5	7
25 kg	38	Rice Lake	-0.85	-0.85	0.32	2.21	13	2.5	7
25 kg	19	Rice Lake	1.53	1.53	0.32	2.21	13	2.5	7
25 kg	9	Rice Lake	-0.86	-0.86	0.32	2.21	13	2.5	7
25 kg	1	Rice Lake	-0.99	-0.99	0.32	2.21	13	2.5	7
25 kg	36	Rice Lake	0.52	0.52	0.32	2.21	13	2.5	7
25 kg	37	Rice Lake	-0.08	-0.08	0.32	2.21	13	2.5	7
25 kg	12	Rice Lake	-0.8	-0.8	0.32	2.21	13	2.5	7
25 kg	4	Rice Lake	-1.1	-1.1	0.32	2.21	13	2.5	7
250 kg	81	Rice Lake	0.06	0.06	0.41	2	20571	2.5	7
250 kg	82	Rice Lake	0.06	0.06	0.41	2	20571	2.5	7
250 kg	83	Rice Lake	0.05	0.05	0.41	2	20571	2.5	7
250 kg	84	Rice Lake	0.06	0.06	0.41	2	20571	2.5	7
250 kg	85	Rice Lake	0.06	0.06	0.41	2	20571	2.5	7
250 kg	86	Rice Lake	0.06	0.06	0.41	2	20571	2.5	7
25 lb	2501	Rice Lake	0.77	0.77	0.2	2.006	398	1.1	7
25 lb	2521	Rice Lake	0.11	0.11	0.2	2.006	398	1.1	7
25 lb	2531	Rice Lake	-0.14	-0.14	0.2	2.006	398	1.1	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.



Division of Weights and Measures
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- All corrections stated in this calibration certificate correlate to a "Conventional Mass" (CM), also known as 'apparent mass', scale verses 8.0 g/cm^3 reference mass density and an air density of 1.2 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)	2.0 E-04
grain (gr)	to kilogram (kg)	6.479 891 E-05
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)	4.535 923 7 E-01

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 28th day of May, 2019 in the city of Indianapolis, Marion County, Indiana

Signature: Howard Wickersham

Howard Wickersham, State Metrologist, Technical Manager