



Calibration Certificate

Certificate Number: 19-677

Calibration Date: 05/28/2019

Calibration Due Date: 05/28/2021

Tested Item(s): 500 lb and 25 lb Test Weights

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

POC: Kevin Koenig

Phone: 812-877-6121

Authorizing Calibration: Kevin Koenig

Date Received: 05/28/2019

Artifact(s) Description

Test Item(s): 500 lb and 25 lb Test Weights

Serial No: Various

Manufacture: Rice Lake

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: 733.0 mm Hg

Humidity: 50.7 % RH

Summary Table

Nominal Mass	Serial No. / ID	Manufacture	Correct	Adjusted	Condemned	Confiscated	Total
500 lb	Various	Rice Lake	15	1	0	0	16
25 lb	Various	Rice Lake	34	1	0	0	35
Grand Total			49	2	0	0	51

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)					
500 lb	656L	Rice Lake	-20.4	-14.2	3.6	2.2	14	23	7.2
500 lb	657L	Rice Lake	9.5	9.5	3.6	2.2	14	23	7.2
500 lb	662L	Rice Lake	12	12	3.6	2.2	14	23	7.2
500 lb	659L	Rice Lake	-9.4	-9.4	3.6	2.2	14	23	7.2
500 lb	651L	Rice Lake	2.5	2.5	3.6	2.2	14	23	7.2
500 lb	663L	Rice Lake	-3.2	-3.2	3.6	2.2	14	23	7.2
500 lb	661L	Rice Lake	-4.8	-4.8	3.6	2.2	14	23	7.2
500 lb	658L	Rice Lake	-12.2	-12.2	3.6	2.2	14	23	7.2
500 lb	653L	Rice Lake	5.4	5.4	3.6	2.2	14	23	7.2
500 lb	650L	Rice Lake	-19.1	-19.1	3.6	2.2	14	23	7.2
500 lb	654L	Rice Lake	-9.3	-9.3	3.6	2.2	14	23	7.2



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500 lb	652L	Rice Lake	-4.8	-4.8	3.6	2.2	14	23	7.2
500 lb	655L	Rice Lake	-14	-14	3.6	2.2	14	23	7.2
500 lb	660L	Rice Lake	6.3	6.3	3.6	2.2	14	23	7.2
500 lb	GL 1	Rice Lake	5	5	3.6	2.2	14	23	7.2
500 lb	GL-2	Rice Lake	8.7	8.7	3.6	2.2	14	23	7.2
25 lb	2511	Rice Lake	0.19	0.19	0.2	2.006	398	1.1	7
25 lb	2517	Rice Lake	0.04	0.04	0.2	2.006	398	1.1	7
25 lb	2537	Rice Lake	-0.02	-0.02	0.2	2.006	398	1.1	7
25 lb	2506	Rice Lake	-0.48	-0.48	0.2	2.006	398	1.1	7
25 lb	2539	Rice Lake	0.73	0.73	0.2	2.006	398	1.1	7
25 lb	2532	Rice Lake	0.64	0.64	0.2	2.006	398	1.1	7
25 lb	2514	Rice Lake	0.54	0.54	0.2	2.006	398	1.1	7
25 lb	2524	Rice Lake	0.45	0.45	0.2	2.006	398	1.1	7
25 lb	2531B	Rice Lake	-0.14	-0.14	0.2	2.006	398	1.1	7
25 lb	2536	Rice Lake	0.05	0.05	0.2	2.006	398	1.1	7
25 lb	211	Rice Lake	0.81	0.81	0.2	2.006	398	1.1	7
25 lb	911	Rice Lake	0.31	0.31	0.2	2.006	398	1.1	7
25 lb	811	Rice Lake	0.68	0.68	0.2	2.006	398	1.1	7
25 lb	2525	Rice Lake	0.51	0.51	0.2	2.006	398	1.1	7
25 lb	2503	Rice Lake	0.35	0.35	0.2	2.006	398	1.1	7
25 lb	2502	Rice Lake	0.35	0.35	0.2	2.006	398	1.1	7
25 lb	2529	Rice Lake	0.05	0.05	0.2	2.006	398	1.1	7
25 lb	2519	Rice Lake	-0.07	-0.07	0.2	2.006	398	1.1	7
25 lb	2520	Rice Lake	0.53	0.53	0.2	2.006	398	1.1	7
25 lb	2507	Rice Lake	0.45	0.45	0.2	2.006	398	1.1	7
25 lb	2516	Rice Lake	0.63	0.63	0.2	2.006	398	1.1	7
25 lb	401	Rice Lake	0.77	0.77	0.2	2.006	398	1.1	7
25 lb	2518	Rice Lake	-0.08	-0.08	0.2	2.006	398	1.1	7
25 lb	2540	Rice Lake	-1.12	0.09	0.2	2.006	398	1.1	7
25 lb	2513	Rice Lake	0.56	0.56	0.2	2.006	398	1.1	7
25 lb	2512	Rice Lake	-0.07	-0.07	0.2	2.006	398	1.1	7
25 lb	2533	Rice Lake	-0.59	-0.59	0.2	2.006	398	1.1	7
25 lb	2522	Rice Lake	0.11	0.11	0.2	2.006	398	1.1	7
25 lb	2538	Rice Lake	0.58	0.58	0.2	2.006	398	1.1	7
25 lb	2535	Rice Lake	0.5	0.5	0.2	2.006	398	1.1	7
25 lb	2504	Rice Lake	-0.15	-0.15	0.2	2.006	398	1.1	7
25 lb	2523	Rice Lake	-0.4	-0.4	0.2	2.006	398	1.1	7
25 lb	2509	Rice Lake	0.67	0.67	0.2	2.006	398	1.1	7
25 lb	2534	Rice Lake	0.05	0.05	0.2	2.006	398	1.1	7
25 lb	2531A	Rice Lake	0.05	0.05	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
Metrology Laboratory
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Indianapolis, IN 46219

Phone: (317) 356-7078 x229

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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