



### Calibration Certificate

Certificate Number: 19-987

Calibration Date: 05/30/2019

Calibration Due Date: 05/30/2020

Tested Item(s): 1000 lb and 25 lb 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: 5/30/2019

#### Artifact(s) Description

Test Item(s): Cast Iron 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 (3/2018)

Temperature: 22.0 °C

Pressure: 733.5 mm Hg

Humidity: 53.8 % RH

#### Summary Table

Nominal Mass	Serial No. / ID	Manufacture	Correct	Adjusted	Condemned	Confiscated	Total
1000 lb	Various	Rice Lake	19	2	0	0	21
25 lb	Various	Rice Lake	2	0	0	0	2
Grand Total			21	2	0	0	23

#### 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/cm <sup>3</sup> )
			As Found (g)	As Left (g)					
1000 lb	20	Rice Lake	9.9	9.9	9.2	2.09	30	45	7
1000 lb	G-692	Rice Lake	43.3	-9.6	9.2	2.09	30	45	7
1000 lb	1	Rice Lake	-7	-7	9.2	2.09	30	45	7
1000 lb	10	Rice Lake	-21.6	-9.1	9.2	2.09	30	45	7
1000 lb	19	Rice Lake	-15.1	-15.1	9.2	2.09	30	45	7
1000 lb	5	Rice Lake	-18.9	-18.9	9.2	2.09	30	45	7
1000 lb	17	Rice Lake	-30	-14.7	9.2	2.09	30	45	7
1000 lb	9	Rice Lake	-32.4	-12.4	9.2	2.09	30	45	7
1000 lb	8	Rice Lake	-14.1	-14.1	9.2	2.09	30	45	7
1000 lb	12	Rice Lake	-21.4	-21.4	9.2	2.09	30	45	7
1000 lb	7	Rice Lake	2.8	2.8	9.2	2.09	30	45	7



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1000 lb	16	Rice Lake	-40.7	-9.1	9.2	2.09	30	45	7
1000 lb	6	Rice Lake	-24.1	-24.1	9.2	2.09	30	45	7
1000 lb	2	Rice Lake	-7.1	-7.1	9.2	2.09	30	45	7
1000 lb	13	Rice Lake	-7.5	-7.5	9.2	2.09	30	45	7
1000 lb	11	Rice Lake	-0.1	-0.1	9.2	2.09	30	45	7
1000 lb	4	Rice Lake	-23.6	-23.6	9.2	2.09	30	45	7
1000 lb	18	Rice Lake	-9.2	-9.2	9.2	2.09	30	45	7
1000 lb	15	Rice Lake	-17.9	-17.9	9.2	2.09	30	45	7
1000 lb	3	Rice Lake	-24.4	-24.4	9.2	2.09	30	45	7
25 lb	2508	Rice Lake	-0.01	-0.01	0.2	2.006	398	1.1	7
25 lb	2528	Rice Lake	-0.15	-0.15	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.

**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. **RED** print indicates an out-of-compliance reading.
- All corrections stated in this calibration certificate correlate to a "Conventional Mass" (CM), also known as 'apparent mass', scale verses  $8.0 \text{ g/cm}^3$  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 30th day of May, 2019 in the city of Indianapolis, Marion County, Indiana

**Signature:** \_\_\_\_\_

Howard Wickersham, State Metrologist, Technical Manager