



Calibration Certificate

Indiana Weights and Measures

Division of Weights and Measures
Metrology Laboratory
2525 N Shadeland Ave Ste D3
Indianapolis, IN 46219

Certificate Number: 21-371

Calibration Due Date: June 29, 2022

Date Received: June 29, 2021

Calibration Date: June 29, 2021

Issue Date: June 30, 2021

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

Calibration Authorized By: Kevin Koenig
Phone: 812-877-6121
Email: kevkoenig@koenigscale.com

Artifact Description(s)

Test Item(s): 250 kg, 500 lb, 20 kg, 10 kg, and 50 lb test weights

Serial No: Various

Manufacture: Various

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

Condition: Suitable for legal metrology.
Minor wear noted.

Material: Cast Iron

Calibration Information

Metrologist: H Wickersham, C Gast, K Scott
Equipment Used: SCCE60K2, MTKC500
Procedure: NISTIR 6969 (2019): SOP 8,
Recommended Standard Operating
Procedure for Medium Accuracy
Calibration of Mass Standards by Modified
Substitution

Temperature: 21.13 °C to 21.45 °C

Mean: 21.34 °C

Pressure: 743.00 mmHg to 743.00 mmHg

Mean: 743.00 mmHg

Relative Humidity: 55.00 % to 63.30 %

Mean: 58.67 %

*Data for individual calibrations
are available upon request.*

Calibration Results

Nominal Mass	Serial No. / ID	Manufacture	Conventional Mass Correction		U ± (g)	k factor	Assumed Density (g/cm ³)	ASTM E617-18 Class Tolerance Met		NIST HB 105-1 (1990), Class F MPE ± (g)	Compliance with NIST HB 105-1 (1990), Class F	
			As Found (g)	As Left (g)				As Found	As Left		As Found	As Left
500 lb	651L	Rice Lake	6.6	6.6	4.3	2.1009	7.2	6	6	23	Pass	Pass
500 lb	661L	Rice Lake	0.5	0.5	4.3	2.1009	7.2	6	6	23	Pass	Pass
500 lb	659L	Rice Lake	-11.2	-11.2	4.3	2.1009	7.2	6	6	23	Pass	Pass
500 lb	658L	Rice Lake	0.9	0.9	4.3	2.1009	7.2	6	6	23	Pass	Pass
500 lb	654L	Rice Lake	-7	-7	4.3	2.1009	7.2	6	6	23	Pass	Pass
500 lb	650L	Rice Lake	-15.6	-15.6	4.3	2.1009	7.2	6	6	23	Pass	Pass
500 lb	652L	Rice Lake	-0.5	-0.5	4.3	2.1009	7.2	6	6	23	Pass	Pass
500 lb	660L	Rice Lake	3.2	3.2	4.3	2.1009	7.2	6	6	23	Pass	Pass
500 lb	656L	Rice Lake	-9.3	-9.3	4.3	2.1009	7.2	6	6	23	Pass	Pass
500 lb	657L	Rice Lake	14.3	14.3	4.3	2.1009	7.2	6	6	23	Pass	Pass
500 lb	653L	Rice Lake	-12.1	-12.1	4.3	2.1009	7.2	6	6	23	Pass	Pass
500 lb	663L	Rice Lake	-1.3	-1.3	4.3	2.1009	7.2	6	6	23	Pass	Pass
500 lb	GL1	Rice Lake	10.8	10.8	4.3	2.1009	7.2	6	6	23	Pass	Pass
500 lb	GL2	Rice Lake	13.5	13.5	4.3	2.1009	7.2	6	6	23	Pass	Pass
500 lb	655L	Rice Lake	-14.1	-14.1	4.3	2.1009	7.2	6	6	23	Pass	Pass
500 lb	662L	Rice Lake	12.8	12.8	4.3	2.1009	7.2	6	6	23	Pass	Pass

Chris Crawford CDC 7/29/21



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250 kg	81	Rice Lake	1.6	1.6	6.3	2.4288	7.2	6	6	25	Pass	Pass
250 kg	82	Rice Lake	6.9	6.9	6.3	2.4288	7.2	6	6	25	Pass	Pass
250 kg	85	Rice Lake	-2.1	-2.1	6.3	2.4288	7.2	6	6	25	Pass	Pass
250 kg	83	Rice Lake	-14.3	-14.3	6.3	2.4288	7.2	6	6	25	Pass	Pass
250 kg	84	Rice Lake	-1.1	-1.1	6.3	2.4288	7.2	6	6	25	Pass	Pass
250 kg	86	Rice Lake	-3.7	-3.7	6.3	2.4288	7.2	6	6	25	Pass	Pass
50 lb	613	Toledo	0.73	0.73	0.33	2.0156	7.2	6	6	2.3	Pass	Pass
50 lb	905	Toledo	0.19	0.19	0.33	2.0156	7.2	6	6	2.3	Pass	Pass
50 lb	910	Toledo	-0.87	-0.87	0.33	2.0156	7.2	6	6	2.3	Pass	Pass
50 lb	909	Toledo	0.28	0.28	0.33	2.0156	7.2	6	6	2.3	Pass	Pass
50 lb	6	Toledo	0.49	0.49	0.33	2.0156	7.2	6	6	2.3	Pass	Pass
50 lb	908	Toledo	-1.12	-1.12	0.33	2.0156	7.2	6	6	2.3	Pass	Pass
50 lb	901	Toledo	-1.29	-1.29	0.33	2.0156	7.2	6	6	2.3	Pass	Pass
50 lb	620	Toledo	0.78	0.78	0.33	2.0156	7.2	6	6	2.3	Pass	Pass
50 lb	619	Toledo	0.29	0.29	0.33	2.0156	7.2	6	6	2.3	Pass	Pass
50 lb	616	Toledo	0.21	0.21	0.33	2.0156	7.2	6	6	2.3	Pass	Pass
50 lb	615	Toledo	0.27	0.27	0.33	2.0156	7.2	6	6	2.3	Pass	Pass
50 lb	618	Toledo	0.34	0.34	0.33	2.0156	7.2	6	6	2.3	Pass	Pass
50 lb	611	Toledo	0.38	0.38	0.33	2.0156	7.2	6	6	2.3	Pass	Pass
50 lb	1017	Toledo	0.22	0.22	0.33	2.0156	7.2	6	6	2.3	Pass	Pass
50 lb	614	Toledo	0.26	0.26	0.33	2.0156	7.2	6	6	2.3	Pass	Pass
50 lb	612	Toledo	-1.24	-1.24	0.33	2.0156	7.2	6	6	2.3	Pass	Pass
50 lb	617	Toledo	-0.99	-0.99	0.33	2.0156	7.2	6	6	2.3	Pass	Pass
50 lb	1011	Toledo	-0.1	-0.1	0.33	2.0156	7.2	6	6	2.3	Pass	Pass
25 kg	6	Rice Lake	0	0	0.33	2.133	7.2	6	6	2.5	Pass	Pass
25 kg	5	Rice Lake	0.7	0.7	0.33	2.133	7.2	6	6	2.5	Pass	Pass
25 kg	26	Rice Lake	0.2	0.2	0.33	2.133	7.2	6	6	2.5	Pass	Pass
25 kg	36	Rice Lake	0.15	0.15	0.33	2.133	7.2	6	6	2.5	Pass	Pass
25 kg	3	Rice Lake	0.56	0.56	0.33	2.133	7.2	6	6	2.5	Pass	Pass
25 kg	18	Rice Lake	0.02	0.02	0.33	2.133	7.2	6	6	2.5	Pass	Pass
25 kg	32	Rice Lake	0.05	0.05	0.33	2.133	7.2	6	6	2.5	Pass	Pass
25 kg	1	Rice Lake	-0.07	-0.07	0.33	2.133	7.2	6	6	2.5	Pass	Pass
25 kg	23	Rice Lake	0.34	0.34	0.33	2.133	7.2	6	6	2.5	Pass	Pass
25 kg	28	Rice Lake	0.43	0.43	0.33	2.133	7.2	6	6	2.5	Pass	Pass
25 kg	25	Rice Lake	0.51	0.51	0.33	2.133	7.2	6	6	2.5	Pass	Pass
25 kg	9	Rice Lake	0.4	0.4	0.33	2.133	7.2	6	6	2.5	Pass	Pass
25 kg	11	Rice Lake	0.17	0.17	0.33	2.133	7.2	6	6	2.5	Pass	Pass
25 kg	7	Rice Lake	0.28	0.28	0.33	2.133	7.2	6	6	2.5	Pass	Pass
25 kg	31	Rice Lake	0.06	0.06	0.33	2.133	7.2	6	6	2.5	Pass	Pass
25 kg	35	Rice Lake	0.26	0.26	0.33	2.133	7.2	6	6	2.5	Pass	Pass
25 kg	40	Rice Lake	0.01	0.01	0.33	2.133	7.2	6	6	2.5	Pass	Pass
25 kg	17	Rice Lake	0.12	0.12	0.33	2.133	7.2	6	6	2.5	Pass	Pass
25 kg	39	Rice Lake	0.03	0.03	0.33	2.133	7.2	6	6	2.5	Pass	Pass
25 kg	34	Rice Lake	0.45	0.45	0.33	2.133	7.2	6	6	2.5	Pass	Pass
25 kg	13	Rice Lake	0.33	0.33	0.33	2.133	7.2	6	6	2.5	Pass	Pass
25 kg	15	Rice Lake	0.48	0.48	0.33	2.133	7.2	6	6	2.5	Pass	Pass
25 kg	4	Rice Lake	0.14	0.14	0.33	2.133	7.2	6	6	2.5	Pass	Pass

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25 kg	14	Rice Lake	0.35	0.35	0.33	2.133	7.2	6	6	2.5	Pass	Pass
25 kg	24	Rice Lake	0.1	0.1	0.33	2.133	7.2	6	6	2.5	Pass	Pass
25 kg	12	Rice Lake	0.43	0.43	0.33	2.133	7.2	6	6	2.5	Pass	Pass
25 kg	21	Rice Lake	0.12	0.12	0.33	2.133	7.2	6	6	2.5	Pass	Pass
25 kg	8	Rice Lake	0.2	0.2	0.33	2.133	7.2	6	6	2.5	Pass	Pass
25 kg	38	Rice Lake	0.38	0.38	0.33	2.133	7.2	6	6	2.5	Pass	Pass
25 kg	27	Rice Lake	0.22	0.22	0.33	2.133	7.2	6	6	2.5	Pass	Pass
25 kg	16	Rice Lake	0.17	0.17	0.33	2.133	7.2	6	6	2.5	Pass	Pass
25 kg	22	Rice Lake	0.67	0.67	0.33	2.133	7.2	6	6	2.5	Pass	Pass
25 kg	19	Rice Lake	0.4	0.4	0.33	2.133	7.2	6	6	2.5	Pass	Pass
25 kg	20	Rice Lake	0.03	0.03	0.33	2.133	7.2	6	6	2.5	Pass	Pass
25 kg	2	Rice Lake	0.13	0.13	0.33	2.133	7.2	6	6	2.5	Pass	Pass
25 kg	30	Rice Lake	0.47	0.47	0.33	2.133	7.2	6	6	2.5	Pass	Pass
25 kg	37	Rice Lake	0.31	0.31	0.33	2.133	7.2	6	6	2.5	Pass	Pass
25 kg	33	Rice Lake	0.47	0.47	0.33	2.133	7.2	6	6	2.5	Pass	Pass
25 kg	10	Rice Lake	0.28	0.28	0.33	2.133	7.2	6	6	2.5	Pass	Pass
25 kg	29	Rice Lake	0.53	0.53	0.33	2.133	7.2	6	6	2.5	Pass	Pass
20 kg	11RK	Rice Lake	0.14	0.14	0.29	2.1689	7.2	6	6	2	Pass	Pass
10 kg	1247-11	Rice Lake	0.08	0.08	0.14	2.1097	7.2	6	6	1	Pass	Pass

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SOP 8 Cast Iron Calibration, Rev 10/2020

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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 International System of Units (SI) through 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 SI unit 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 a 95.45 % level of confidence. The expanded uncertainty presented in this calibration certificate is consistent with the Bureau International des Poids et Mesures (BIPM) Guide to the Expression of Uncertainty in Measurement (2008) (GUM). No Surface Roughness evaluation or Magnetic Susceptibility testing has been performed and as a result there are no components for the effects of either in the uncertainty budget.

Conformity Statement

These artifacts were evaluated using NISTIR 6969: Selected Laboratory and Measurement Practices and Procedures to Support Basic Mass Calibrations (2019), SOP 8 Recommended Standard Operating Procedure for Medium Accuracy Calibration of Mass Standards by Modified Substitution. The artifacts notated with "Pass" in the Calibration Results section have been found and/or left within the Maximum Permissible Error (MPE) for NIST HB 105-1 (1990), Class F and are in compliance with that specification. An artifact is considered in compliance when the conventional mass correction plus the measurement uncertainty is equal to or less than the MPE. Bold print and a "Fail" notation indicates an out-of-compliance reading. No Surface Roughness evaluation or Magnetic Susceptibility testing has been performed. Possession of this certificate does imply this artifact meets any other requirements or statutes that may be required.

Pertinent Information

In accordance with Indiana Code (IC) 24-6-3-2, a calibration interval or recall date must be assigned to all calibrations performed by this laboratory. The results listed in this calibration certificate relate only to the artifacts described and extent of calibrations performed. 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 0.0012 g/cm^3 at $20 \text{ }^\circ\text{C}$.

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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)	3.887 934 6 E-03
scruple (apothecary) (s)	to kilogram (kg)	1.295 978 2 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 30th day of June, 2021 in the city of Indianapolis, Marion County, Indiana

Reviewed By

Christopher Gast
Metrologist, ISDH

Authorized Signatory

Howard Wickersham
Metrologist, ISDH

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