



# Calibration Certificate

Indiana Weights and Measures

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

**Certificate Number: 21-378**  
**Calibration Due Date: July 1, 2022**

**Date Received:** June 29, 2021  
**Calibration Date:** July 1, 2021  
**Issue Date:** July 15, 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):** 10 lb to 0.001 lb and 5 lb to 1/32 oz Avdp  
Test Kits

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

**Condition:** Suitable for legal metrology.  
Minor wear noted.

**Serial No:** KS-L486, KS-1AD2

**Manufacture:** Rice Lake

**Material:** Stainless Steel

## Calibration Information

**Metrologist:** C Gast, K Scott

**Temperature:** 0.83 °C to 19.61 °C

**Equipment Used:** MCM5004, MTAX206, MTXPR6U

Mean: 18.55 °C

**Procedure:** NISTIR 6969 (2019): SOP 8,  
Recommended Standard Operating  
Procedure for Medium Accuracy  
Calibration of Mass Standards by Modified  
Substitution

**Pressure:** 738.01 mmHg to 740.28 mmHg

Mean: 739.01 mmHg

**Relative Humidity:** 50.27 % to 57.20 %

Mean: 52.86 %

*Data for individual calibrations is  
available upon request.*

## Calibration Results

Nominal Mass	Serial No. / ID	Manufacture	Conventional Mass Correction		U ± (mg)	k factor	Assumed Density (g/cm <sup>3</sup> )	ASTM E617-18 Class Tolerance Met		NIST HB 105-1 (1990), Class F MPE ± (mg)	Compliance with NIST HB 105-1 (1990), Class F	
			As Found (mg)	As Left (mg)				As Found	As Left		As Found	As Left
10 lb	KS-1AD2: No dot	Rice Lake	137	137	54	2.0282	7.95	5	5	450	Pass	Pass
10 lb	KS-1AD2: Dot	Rice Lake	130	130	54	2.0282	7.95	5	5	450	Pass	Pass
5 lb	KS-L486: 11	Rice Lake	51	51	28	2.0145	7.95	5	5	230	Pass	Pass
5 lb	KS-L486: 12	Rice Lake	14	14	28	2.0145	7.95	4	4	230	Pass	Pass
5 lb	KS-L486: 13	Rice Lake	29	29	28	2.0145	7.95	5	5	230	Pass	Pass
5 lb	KS-L486: 14	Rice Lake	31	31	28	2.0145	7.95	5	5	230	Pass	Pass
5 lb	KS-L486: 15	Rice Lake	46	46	28	2.0145	7.95	5	5	230	Pass	Pass
5 lb	KS-1AD2: Unmarked	Rice Lake	72	72	28	2.0145	7.95	5	5	230	Pass	Pass
2 lb	KS-1AD2: No dot	Rice Lake	21	21	12	2.0157	7.95	5	5	91	Pass	Pass
2 lb	KS-1AD2: Dot	Rice Lake	9	9	12	2.0157	7.95	5	5	91	Pass	Pass
1 lb	KS-1AD2	Rice Lake	20.3	20.3	9	2.0122	7.95	6	6	70	Pass	Pass
1 lb	KS-L486: 1	Rice Lake	19.6	19.6	9	2.0122	7.95	6	6	70	Pass	Pass
1 lb	KS-L486: 2	Rice Lake	19.1	19.1	9	2.0122	7.95	6	6	70	Pass	Pass
1 lb	KS-L486: 3	Rice Lake	30.2	30.2	9	2.0122	7.95	6	6	70	Pass	Pass
1 lb	KS-L486: 4	Rice Lake	10.8	10.8	9	2.0122	7.95	5	5	70	Pass	Pass
1 lb	KS-L486: 5	Rice Lake	21.9	21.9	9	2.0122	7.95	6	6	70	Pass	Pass
0.5 lb	KS-L486: Unmarked	Rice Lake	14.2	14.2	6	2.0136	7.95	6	6	45	Pass	Pass
0.5 lb	KS-1AD2: unmarked	Rice Lake	9	9	6	2.0136	7.95	5	5	45	Pass	Pass

*Chris Crawford*



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4 oz	S-L486: Unmarked	Rice Lake	6.8	6.8	2.7	2.0334	7.95	6	6	23	Pass	Pass
0.2 lb	KS-1AD2: No dot	Rice Lake	7.6	7.6	2.2	2.0234	7.95	7	7	18	Pass	Pass
0.2 lb	KS-1AD2: Dot	Rice Lake	7.2	7.2	2.2	2.0234	7.95	7	7	18	Pass	Pass
2 oz	S-L486: Unmarked	Rice Lake	3.8	3.8	1.3	2.0392	7.95	5	5	11	Pass	Pass
0.1 lb	S-1AD2: Unmarked	Rice Lake	3.5	3.5	1.1	2.0248	7.95	5	5	9.1	Pass	Pass
1 oz	S-L486: Unmarked	Rice Lake	-0.4	-0.4	0.65	2.0353	7.95	5	5	5.4	Pass	Pass
0.05 lb	S-1AD2: Unmarked	Rice Lake	1.36	1.36	0.54	2.0241	7.95	5	5	4.5	Pass	Pass
1/2 oz	S-L486: Unmarked	Rice Lake	1.25	1.25	0.34	2.0398	7.95	5	5	2.8	Pass	Pass
0.02 lb	KS-1AD2: No dot	Rice Lake	0.1	0.1	0.23	2.0256	7.95	4	4	1.8	Pass	Pass
0.02 lb	KS-1AD2: Dot	Rice Lake	0.25	0.25	0.23	2.0256	7.95	5	5	1.8	Pass	Pass
1/4 oz	S-L486: Unmarked	Rice Lake	0.23	0.23	0.21	2.044	7.95	5	5	1.7	Pass	Pass
0.01 lb	S-1AD2: Unmarked	Rice Lake	0.66	0.66	0.18	2.0719	7.95	5	5	1.5	Pass	Pass
1/8 oz	S-L486: Unmarked	Rice Lake	0.43	0.43	0.16	2.1812	7.95	5	5	1.3	Pass	Pass
0.005 lb	S-1AD2: Unmarked	Rice Lake	0.63	0.63	0.15	2.0699	7.95	5	5	1.2	Pass	Pass
1/16 oz	KS-L486	Rice Lake	0.32	0.32	0.13	2.0645	7.95	5	5	1.1	Pass	Pass
0.002 lb	KS-1AD2: No dot	Rice Lake	0.51	0.51	0.11	2.074	7.95	6	6	0.87	Pass	Pass
0.002 lb	KS-1AD2: Dot	Rice Lake	0.47	0.47	0.11	2.074	7.95	6	6	0.87	Pass	Pass
1/32 oz	KS-L486: No dot	Rice Lake	0.46	0.46	0.11	2.1051	7.95	6	6	0.87	Pass	Pass
0.001 lb	S-1AD2: Unmarked	Rice Lake	0.166	0.166	0.083	2.0719	7.95	5	5	0.7	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 versus  $8.0 \text{ g/cm}^3$  reference mass density and an air density of  $0.0012 \text{ g/cm}^3$  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)	<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)	3.887 934 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)	<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 15th day of July, 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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