SOUTH DAKOTA
DEPARTMENT OF PUBLIC SAFETY
prevention ~ protection ~ enforcement

Office of Weights and Measures
Metrology Laboratory
Office: 118 West Capitol Avenue, Pierre, SD 57501
Lab: 1100 Otter Rd, Bldg D, Sturgis, SD 57785
Lab: 605-347-7541, Office: 605-773-3697, Cell: 605-280-4572
Email: ron.peterson@state.sd.us https://dps.sd.gov/inspections/weights-measures

CALIBRATION CERTIFICATE

K-Scale SA# **90** **Certificate number:** M25014

Physical Address:
1701 W Madison
Sioux Falls, SD 57104

Billing Address:
1701 W Madison
Sioux Falls, SD 57104

Contact: Kevin Baumgartner
Phone: 605-334-8003

Received Date: 10/21/2024
Certificate Issued: 10/22/2024

Artifacts Submitted and Summary of Results:

Quantity	Artifact	Total Pieces	Recvd in Tol	Adjusted	Rejected	As Left In Tolerance
1	4000 lb Weight Cart	1	0	1	0	1
40	1000 lb Weights	40	39	3	0	40
3	500 lb Weights	3	2	0	1	2
73	50 lb Weights	73	69	23	0	73
48	25 lb Weights	48	44	14	0	48
6	Loose Weights	6	6	1	0	6
7	Weight kits	118	118	0	0	118

Uncertainty Statement: The combined standard uncertainty includes the standard uncertainty reported for the standard and the standard uncertainty for the measurement process. The combined standard uncertainty is multiplied by a coverage factor *k* to provide an expanded uncertainty which defines an interval having a level of confidence of approximately 95 percent. The expanded uncertainty presented in this report is consistent with the 2008 ISO/IEC Guide to the Expression of Uncertainty in Measurement. The expanded uncertainty is not to be confused with a tolerance limit for the user during application. For weight carts, factors included on the inspection checklist have not been included in the calibration uncertainty. However, factors on the checklist may contribute measurement errors that are significant if not properly maintained during use.

Conformity Statement:
The artifacts submitted for this calibration are calibrated to NIST Handbook 105-1 (1990 or 2019), NIST Handbook 105-8 (2019), NIST Handbook 105-3 (2010), or ASTM E617 (2023), Standard Specification for Laboratory Weights and Precision Mass Standards specifications. The reported test values relate only to the observations made at the time and conditions of the test. Artifacts fully comply with all requirements (both specifications and tolerances) of the applicable documentary standard unless otherwise stated. Stated expanded uncertainties are less than one-third of the specified tolerances (maximum permissible errors, m.p.e.) for mass calibrations and less than the specified tolerances for volume calibrations. The correction value plus or minus the expanded uncertainty is within the stated tolerances. It is the decision rule of the SD State Metrology Laboratory that any cast weights determined to have a correction within 66 % of the upper tolerance or 50 % of the lower tolerance will be adjusted closer to zero mass correction, even if the mass correction originally met the applicable tolerance.

Traceability Statement:
The Standards of the SD Metrology Laboratory used for comparison are traceable to the International System of Units (SI) through the National Institute of Standards and Technology. The laboratory certificate number identified above is the unique report number to be used in referencing measurement traceability for artifacts identified in this report only.

This document does not represent or imply endorsement by NIST Office of Weights and Measures or any agency of the State and/or national governments. This report may not be reproduced, except in full without the written approval of this laboratory. The client must not use this

Ron E Peterson, Metrologist 10/22/2024

Dwight R Johnson, Reviewer 10/22/2024

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CALIBRATION CERTIFICATE

Calibrated for: **K-Scale** Certificate Number: **M25014**

Calibration Date: **10/22/2024**

Environmental conditions at time of test:

Temperature: 22 °C **Humidity:** 44.5 % **Pressure:** 670 mmhg

Test method used: SOP 33 Calibrations of Weight Carts, May 2019

Test equipment used: Recently calibrated weights and a Mettler SLS510 Load Cell with IND570 Indicator.
Vaisala PT301

Condition of Carts: Used but in good condition

Manufacturer: B-Tek Scales **SN:** 16592B

Nominal (lb)	AS Found (lb)	As Found (g)	As Left (lb)	As Left (g)	Uncertainty (lb)	*k*	Tolerance (lb)	Condition as Left
4000	1.70	770	0.05	23	0.12	2.01	1.40	Adjusted

Notes:

The values reported relate only to those observations made at the time and conditions of the test. This calibration certificate, so numbered, may not be reproduced, except in full, without approval of the laboratory.

The above weight cart was allowed to come to environmental equilibrium in the laboratory prior to calibration. The weight cart was adjusted if needed and as noted above to as close as practical to zero error. All fluid levels must be maintained as close to reference levels as possible during use. Any maintenance, repairs or damage to weight cart or its components will likely result in an out-of-tolerance condition; therefore, maintenance or replacement of components such as batteries, tires, filters, etc. will require recalibration of the weight cart prior to subsequent use.

Conformity Assessment:
The weight cart identified on this calibration certificate complies with NIST Handbook 105-8, 2019 specifications and tolerances. Additional details regarding the assessment are included in the associated checklist that is an integral part of this calibration certificate. The weight cart was found (or adjusted) to within the specified tolerances.

The above weight cart was compared with standards of the State of South Dakota, which are traceable to the International System of Units (SI) through the National Institute of Standards and Technology (NIST) and have current calibration values. The assigned certificate number provides documented evidence for measurement traceability.

Ron E Peterson, Metrologist 10/22/2024 Dwight R Johnson, Reviewer 10/22/2024

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Inspection Checklist for Weight Cart

Calibrated for: K-Scale **Certificate number:** **M25014**

Calibration Date: 10/28/2024

Manufacturer:	**B-Tek Scales**	**Date of Manufacture**	43221
Model Number:	**BS4WTC-4000**	**ID/SN Number**	16592B

✓	Nominal Mass of Weight Cart	4000 lbs		Suitably marked: Yes/No		Yes
✓	Powered by:	Electric/generator		Diesel		Gasoline ✓
✓	Fluid Levels:	Engine Oil	✓			
		Hydraulic Fluid	✓	Sealed: Yes/No		Yes
		Battery	✓	Sealed: Yes/No		Yes
		Liquid Fuel	✓	Reference Line Present: Yes/No		Yes

✓	Fluid drain tubes extend beyond the body of the cart: Yes/No		Yes	
✓	Number of axles:	2		
✓	Number /Size of Tires	21X7X15		
✓	Sealed wheel bearings: Yes/No	Yes		
✓	Drain holes present in locations where water may accumulate: Yes/No		Yes	
✓	Weight restraint railing permanently fixed and solid: Yes/No		Yes	
✓	Adjusting cavity accessible: Yes/No	Yes	Approximate capacity:(lbs)	150
✓	Adjusting cavity sealed: Yes/No	Yes		
✓	Service brakes functioning properly: Yes/No		Yes	
✓	Parking brakes functioning properly: Yes/No		Yes	
	Remote control functioning properly: Yes/No			

✓ General condition at time of calibration (note any accumulated dirt/debris, damage, loose parts, or evidence of tampering or unauthorized entry of seals).

List and report any repair and maintenance performed, parts replaced, etc., Leaks repaired, new battery, carburetor, exhaust system, wheels changed, welding performed, etc. Include any comments or changes since the last calibration.

✓

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CALIBRATION CERTIFICATE

Calibrated for: **K-Scale** **Certificate number:** **M25014**

Calibration Date: 10/22/2024 Purchase Order Number: **0**

Environmental conditions at time of test: Serial#

Temperature: 22 °C **Humidity:** 45 % **Pressure:** 669.5 mmhg

Test method used: SOP 8 Medium Accuracy Calibrations of Mass Standards by Modified Subtitution, May 2019

Test equipment used: Lab standards traceable to the SI, an XPE604KMC balance, and a Vaisala PTU301

Condition of Weights: Cleaned and painted

Artifact(s): **20 - 1000 lb weights**

Nominal		Correction as Found		Correction as Left		NIST Class F	Uncertainty		Condition
	SN/ID	lb	g	lb	g	Tolerance (g)	g	*k*	As Left
1000 lb	3	-0.01	-3.1	-0.01	-3.1	45	4.7	2.0	In-Tolerance
1000 lb	5	0.04	18.4	0.04	18.4	45	4.7	2.0	In-Tolerance
1000 lb	6	-0.03	-12.9	-0.03	-12.9	45	4.7	2.0	In-Tolerance
1000 lb	7	-0.05	-22.0	-0.05	-22.0	45	4.7	2.0	In-Tolerance
1000 lb	9	-0.01	-3.6	-0.01	-3.6	45	4.7	2.0	In-Tolerance
1000 lb	10	-0.03	-14.9	-0.03	-14.9	45	4.7	2.0	In-Tolerance
1000 lb	12	0.04	16.0	0.04	16.0	45	4.7	2.0	In-Tolerance
1000 lb	12	-0.04	-17.8	-0.04	-17.8	45	4.7	2.0	In-Tolerance
1000 lb	17	-0.02	-11.2	-0.02	-11.2	45	4.7	2.0	In-Tolerance
1000 lb	19	0.11	48.7	0.00	-0.1	45	4.7	2.0	Adjusted
1000 lb	26	-0.03	-13.1	-0.03	-13.1	45	4.7	2.0	In-Tolerance
1000 lb	D	0.07	33.4	0.00	-0.1	45	4.7	2.0	Adjusted
1000 lb	E	0.02	10.2	0.02	10.2	45	4.7	2.0	In-Tolerance
1000 lb	H18	0.02	9.1	0.02	9.1	45	4.7	2.0	In-Tolerance
1000 lb	J18	0.00	-0.2	0.00	-0.2	45	4.7	2.0	In-Tolerance
1000 lb	L1	0.05	23.1	0.05	23.1	45	4.7	2.0	In-Tolerance
1000 lb	M	0.00	1.2	0.00	1.2	45	4.7	2.0	In-Tolerance
1000 lb	N18	0.02	9.2	0.02	9.2	45	4.7	2.0	In-Tolerance
1000 lb	P	0.01	2.6	0.01	2.6	45	4.7	2.0	In-Tolerance
1000 lb	SS	-0.04	-16.7	-0.04	-16.7	45	4.7	2.0	In-Tolerance

* Adjusted artifacts are in tolerance. Rejected and Condemned artifacts were tagged and must be placed out of service.

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Treatment of artifacts prior to testing: Thermal equilibrium was obtained by placing the artifacts in the lab overnight

Ron E Peterson, Metrologist 10/22/2024 Dwight R Johnson, Reviewer 10/22/2024

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CALIBRATION CERTIFICATE

Calibrated for: **K-Scale** **Certificate number:** **M25014**

Calibration Date: 10/23/2024 Purchase Order Number: **0**

Environmental conditions at time of test: Serial#

Temperature: 20 °C **Humidity:** 46 % **Pressure:** 672 mmhg

Test method used: SOP 8 Medium Accuracy Calibrations of Mass Standards by Modified Subtitution, May 2019

Test equipment used: Lab standards traceable to the SI, an XPE604KMC balance, and a Vaisala PTU301

Condition of Weights: Cleaned and painted

Artifact(s): **20 - 1000 lb weights**

Nominal		Correction as Found		Correction as Left		NIST Class F	Uncertainty		Condition
	SN/ID	lb	g	lb	g	Tolerance (g)	g	*k*	As Left
1000 lb	1	-0.02	-10.2	-0.02	-10.2	45	4.7	2.0	In-Tolerance
1000 lb	2	-0.01	-2.6	-0.01	-2.6	45	4.7	2.0	In-Tolerance
1000 lb	8	-0.02	-6.9	-0.02	-6.9	45	4.7	2.0	In-Tolerance
1000 lb	13	-0.04	-20.4	-0.04	-20.4	45	4.7	2.0	In-Tolerance
1000 lb	14	-0.02	-9.8	-0.02	-9.8	45	4.7	2.0	In-Tolerance
1000 lb	14	0.02	9.4	0.02	9.4	45	4.7	2.0	In-Tolerance
1000 lb	15	-0.08	-36.7	0.00	0.1	45	4.7	2.0	Adjusted
1000 lb	20	-0.05	-21.9	-0.05	-21.9	45	4.7	2.0	In-Tolerance
1000 lb	20	0.00	-2.1	0.00	-2.1	45	4.7	2.0	In-Tolerance
1000 lb	21	0.01	2.8	0.01	2.8	45	4.7	2.0	In-Tolerance
1000 lb	24	0.05	20.9	0.05	20.9	45	4.7	2.0	In-Tolerance
1000 lb	C	0.05	21.2	0.05	21.2	45	4.7	2.0	In-Tolerance
1000 lb	GG	0.03	15.6	0.03	15.6	45	4.7	2.0	In-Tolerance
1000 lb	I	0.00	0.1	0.00	0.1	45	4.7	2.0	In-Tolerance
1000 lb	J	0.03	12.5	0.03	12.5	45	4.7	2.0	In-Tolerance
1000 lb	K	0.00	-0.4	0.00	-0.4	45	4.7	2.0	In-Tolerance
1000 lb	MM	0.00	0.3	0.00	0.3	45	4.7	2.0	In-Tolerance
1000 lb	RR	0.00	-1.7	0.00	-1.7	45	4.7	2.0	In-Tolerance
1000 lb	VV	0.01	4.9	0.01	4.9	45	4.7	2.0	In-Tolerance
1000 lb	Z	0.03	12.2	0.03	12.2	45	4.7	2.0	In-Tolerance

* Adjusted artifacts are in tolerance. Rejected and Condemned artifacts were tagged and must be placed out of service.

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Treatment of artifacts prior to testing: Thermal equilibrium was obtained by placing the artifacts in the lab overnight

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Calibrated for: **K-Scale** **Certificate number:** **M25014**

Calibration Date: 10/22/2024 Purchase Order Number: **0**

Environmental conditions at time of test: Serial#

Temperature: 20 °C **Humidity:** 50 % **Pressure:** 672 mmhg

Test method used: SOP 8 Medium Accuracy Calibrations of Mass Standards by Modified Subtitution, May 2019

Test equipment used: Lab standards traceable to the SI, an XPE604KMC balance, and a Vaisala PTU301

Condition of Weights: Cleaned and painted

Artifact(s): **3 - 500 lb weights**

Nominal		Correction as Found		Correction as Left		ASTM E 617 Class 6	Uncertainty		Condition
	SN/ID	lb	g	lb	g	Tolerance (g)	g	*k*	As Left
500 lb	A	0.06	25.2	Rejected	Rejected	23	2.3	2.0	Rejected
500 lb	B	-0.01	-3.3	-0.01	-3.3	23	2.3	2.0	In-Tolerance
500 lb	D	0.01	4.5	0.01	4.5	23	2.3	2.0	In-Tolerance

500 lb weight, serial number A was rejected for broken shoulder supporting lead seal.

* Adjusted artifacts are in tolerance. Rejected and Condemned artifacts were tagged and must be placed out of service.

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Treatment of artifacts prior to testing: Thermal equilibrium was obtained by placing the artifacts in the lab overnight

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CALIBRATION CERTIFICATE

Calibrated for: K-Scale **Certificate number:** M25014

Calibration Date: 10/22/2024 **Purchase Order Number:**

Environmental conditions at time of test: Serial#

Temperature: 21 °C **Humidity:** 47 % **Pressure:** 672 mmhg

Test method used: SOP 8 Medium Accuracy Calibrations of Mass Standards by Modified Subtitution, May 2019

Test equipment used: Lab standards traceable to the SI, XPR64003LD5C, XPR5003SC, XPR226CDR, XPR36C, Vaisala PTU301

Condition of Weights: Suitable for use. No significant wear or damage

Artifact(s): **28 50 lb weights**

Nominal		Correction as Found	Correction as Left	NIST Class F	Uncertainty		Condition
	SN/ID	mg	mg	Tolerance (mg)	mg	*k*	As Left
50 lb	1	-708	-708	2300	200	2.02	In-Tolerance
50 lb	2	-283	-283	2300	200	2.02	In-Tolerance
50 lb	4	-1653	-13	2300	200	2.02	Adjusted
50 lb	5	-1508	-8	2300	200	2.02	Adjusted
50 lb	7	247	247	2300	200	2.02	In-Tolerance
50 lb	7	-548	-548	2300	200	2.02	In-Tolerance
50 lb	8	-728	-728	2300	200	2.02	In-Tolerance
50 lb	10	-863	-863	2300	200	2.02	In-Tolerance
50 lb	13	-638	-638	2300	200	2.02	In-Tolerance
50 lb	18	-2163	7	2300	200	2.02	Adjusted
50 lb	21	-663	-663	2300	200	2.02	In-Tolerance
50 lb	21	372	372	2300	200	2.02	In-Tolerance
50 lb	22	-378	-378	2300	200	2.02	In-Tolerance
50 lb	25	-1458	12	2300	200	2.02	Adjusted
50 lb	27	-1198	-18	2300	200	2.02	Adjusted
50 lb	32	602	602	2300	200	2.02	In-Tolerance
50 lb	33	-2203	37	2300	200	2.02	Adjusted
50 lb	34	-628	-628	2300	200	2.02	In-Tolerance
50 lb	45	-1553	22	2300	200	2.02	Adjusted
50 lb	50	-498	-498	2300	200	2.02	In-Tolerance
50 lb	51	-1208	-8	2300	200	2.02	Adjusted
50 lb	52	-848	-848	2300	200	2.02	In-Tolerance
50 lb	97	-1328	-13	2300	200	2.02	Adjusted
50 lb	98	-1598	-8	2300	200	2.02	Adjusted
50 lb	321	-1273	-18	2300	200	2.02	Adjusted
50 lb	333	-723	-723	2300	200	2.02	In-Tolerance
50 lb	C44	-1253	32	2300	200	2.02	Adjusted
50 lb	F	12	12	2300	200	2.02	In-Tolerance

* Adjusted artifacts are in tolerance. Rejected and Condemned artifacts were tagged and must be placed out of service.

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Treatment of artifacts prior to testing: Thermal equilibrium was obtained by placing the artifacts in the lab overnight

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CALIBRATION CERTIFICATE

Calibrated for: K-Scale **Certificate number:** M25014

Calibration Date: 10/23/2024 **Purchase Order Number:**

Environmental conditions at time of test: Serial#

Temperature: 21 °C **Humidity:** 48 % **Pressure:** 671 mmhg

Test method used: SOP 8 Medium Accuracy Calibrations of Mass Standards by Modified Subtitution, May 2019

Test equipment used: Lab standards traceable to the SI, XPR64003LD5C, XPR5003SC, XPR226CDR, XPR36C, Vaisala PTU301

Condition of Weights: Suitable for use. No significant wear or damage

Artifact(s): **23 50 lb hanging weights**

Nominal		Correction as Found	Correction as Left	NIST Class F	Uncertainty		Condition
	SN/ID	mg	mg	Tolerance (mg)	mg	*k*	As Left
50 lb	A	1642	7	2300	200	2.02	Adjusted
50 lb	12	-698	-698	2300	200	2.02	In-Tolerance
50 lb	21	-208	-208	2300	200	2.02	In-Tolerance
50 lb	25	-1253	47	2300	200	2.02	Adjusted
50 lb	27	667	667	2300	200	2.02	In-Tolerance
50 lb	29	-1243	42	2300	200	2.02	Adjusted
50 lb	31	-698	-698	2300	200	2.02	In-Tolerance
50 lb	32	-148	-148	2300	200	2.02	In-Tolerance
50 lb	34	1332	1332	2300	200	2.02	In-Tolerance
50 lb	35	-68	-68	2300	200	2.02	In-Tolerance
50 lb	36	-5318	32	2300	200	2.02	Adjusted
50 lb	37	502	502	2300	200	2.02	In-Tolerance
50 lb	39	-1328	32	2300	200	2.02	Adjusted
50 lb	46	-678	-678	2300	200	2.02	In-Tolerance
50 lb	46	-588	-588	2300	200	2.02	In-Tolerance
50 lb	47	-608	-608	2300	200	2.02	In-Tolerance
50 lb	49	42	42	2300	200	2.02	In-Tolerance
50 lb	50	-1118	-1118	2300	200	2.02	In-Tolerance
50 lb	51	-2568	17	2300	200	2.02	Adjusted
50 lb	59	-353	-353	2300	200	2.02	In-Tolerance
50 lb	81	-258	-258	2300	200	2.02	In-Tolerance
50 lb	C	-338	-338	2300	200	2.02	In-Tolerance
50 lb	H	-973	-973	2300	200	2.02	In-Tolerance

* Adjusted artifacts are in tolerance. Rejected and Condemned artifacts were tagged and must be placed out of service.

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Treatment of artifacts prior to testing: Thermal equilibrium was obtained by placing the artifacts in the lab overnight

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CALIBRATION CERTIFICATE

Calibrated for: K-Scale **Certificate number:** M25014

Calibration Date: 10/23/2024 **Purchase Order Number:**

Environmental conditions at time of test: Serial#

Temperature: 21.5 °C **Humidity:** 45.1 % **Pressure:** 671.5 mmhg

Test method used: SOP 8 Medium Accuracy Calibrations of Mass Standards by Modified Subtitution, May 2019

Test equipment used: Lab standards traceable to the SI, XPR64003LD5C, XPR5003SC, XPR226CDR, XPR36C, Vaisala PTU301

Condition of Weights: Suitable for use. No significant wear or damage

Artifact(s): **22 50 lb weights**

Nominal		Correction as Found	Correction as Left	NIST Class F	Uncertainty		Condition
	SN/ID	mg	mg	Tolerance (mg)	mg	*k*	As Left
50 lb	1	-1803	-8	2300	200	2.02	Adjusted
50 lb	3	-693	-693	2300	200	2.02	In-Tolerance
50 lb	6	-183	-183	2300	200	2.02	In-Tolerance
50 lb	9	-108	-108	2300	200	2.02	In-Tolerance
50 lb	11	-1233	7	2300	200	2.02	Adjusted
50 lb	14	-53	-53	2300	200	2.02	In-Tolerance
50 lb	15	-828	-828	2300	200	2.02	In-Tolerance
50 lb	17	-883	-883	2300	200	2.02	In-Tolerance
50 lb	20	-678	-678	2300	200	2.02	In-Tolerance
50 lb	24	-58	-58	2300	200	2.02	In-Tolerance
50 lb	25	-948	-948	2300	200	2.02	In-Tolerance
50 lb	28	-698	-698	2300	200	2.02	In-Tolerance
50 lb	31	-883	-883	2300	200	2.02	In-Tolerance
50 lb	36	-1603	67	2300	200	2.02	Adjusted
50 lb	39	632	632	2300	200	2.02	In-Tolerance
50 lb	40	-1098	-1098	2300	200	2.02	In-Tolerance
50 lb	41	52	52	2300	200	2.02	In-Tolerance
50 lb	47	-963	-963	2300	200	2.02	In-Tolerance
50 lb	48	-1363	2	2300	200	2.02	Adjusted
50 lb	53	-1458	22	2300	200	2.02	Adjusted
50 lb	90	-153	-153	2300	200	2.02	In-Tolerance
50 lb	F	-78	-78	2300	200	2.02	In-Tolerance

* Adjusted artifacts are in tolerance. Rejected and Condemned artifacts were tagged and must be placed out of service.

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Treatment of artifacts prior to testing: Thermal equilibrium was obtained by placing the artifacts in the lab overnight

Ron E Peterson, Metrologist 10/23/2024 Dwight R Johnson, Reviewer 10/23/2024

South Dakota Department of Public Safety
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Metrology Lab
Lab: 1100 Otter Rd, Bldg. D Sturgis, SD 57785 Phone: 605-347-7541
Office: 118 West Capitol Avenue Pierre, SD 57501 Phone: 605-773-3697

CALIBRATION CERTIFICATE

Calibrated for: K-Scale **Certificate number:** M25014

Calibration Date: 10/23/2024 **Purchase Order Number:**

Environmental conditions at time of test: Serial#

Temperature: 21 °C **Humidity:** 47 % **Pressure:** 672 mmhg

Test method used: SOP 8 Medium Accuracy Calibrations of Mass Standards by Modified Subtitution, May 2019

Test equipment used: Lab standards traceable to the SI, XPR64003LD5C, XPR5003SC, XPR226CDR, XPR36C, Vaisala PTU301

Condition of Weights: Suitable for use. No significant wear or damage

Artifact(s): **28 25 lb weights**

Nominal		Correction as Found	Correction as Left	NIST Class F	Uncertainty		Condition
	SN/ID	mg	mg	Tolerance (mg)	mg	*k*	As Left
25 lb	2	-689	16	1100	120	2.02	Adjusted
25 lb	56	186	186	1100	120	2.02	In-Tolerance
25 lb	IPJ7	186	186	1100	120	2.02	In-Tolerance
25 lb	IPJ9	-54	-54	1100	120	2.02	In-Tolerance
25 lb	IPJA	-874	41	1100	120	2.02	Adjusted
25 lb	IPJB	-354	-354	1100	120	2.02	In-Tolerance
25 lb	IPJD	-519	-519	1100	120	2.02	In-Tolerance
25 lb	IPJE	-649	-4	1100	120	2.02	Adjusted
25 lb	IPJF	26	26	1100	120	2.02	In-Tolerance
25 lb	IPJH	-334	-334	1100	120	2.02	In-Tolerance
25 lb	IPJI	246	246	1100	120	2.02	In-Tolerance
25 lb	IPJJ	-539	-539	1100	120	2.02	In-Tolerance
25 lb	IPJL	-459	-459	1100	120	2.02	In-Tolerance
25 lb	IPJM	-934	-14	1100	120	2.02	Adjusted
25 lb	IPJN	-109	-109	1100	120	2.02	In-Tolerance
25 lb	IPJO	-209	-209	1100	120	2.02	In-Tolerance
25 lb	IPJP	-199	-199	1100	120	2.02	In-Tolerance
25 lb	IPJP	-944	1	1100	120	2.02	Adjusted
25 lb	IPJQ	-304	-304	1100	120	2.02	In-Tolerance
25 lb	IPJS	196	196	1100	120	2.02	In-Tolerance
25 lb	IPJT	-1214	-14	1100	120	2.02	Adjusted
25 lb	IPJV	-349	-349	1100	120	2.02	In-Tolerance
25 lb	IPJW	36	36	1100	120	2.02	In-Tolerance
25 lb	IPJX	-1129	1	1100	120	2.02	Adjusted
25 lb	IPJZ	-549	-549	1100	120	2.02	In-Tolerance
25 lb	IPK1	-469	-469	1100	120	2.02	In-Tolerance
25 lb	IPK3	-789	1	1100	120	2.02	Adjusted
25 lb	IPK4	-569	6	1100	120	2.02	Adjusted

* Adjusted artifacts are in tolerance. Rejected and Condemned artifacts were tagged and must be placed out of service.

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Treatment of artifacts prior to testing: Thermal equilibrium was obtained by placing the artifacts in the lab overnight

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CALIBRATION CERTIFICATE

Calibrated for: K-Scale **Certificate number:** M25014

Calibration Date: 10/23/2024 **Purchase Order Number:**

Environmental conditions at time of test: Serial#

Temperature: 21 °C **Humidity:** 47 % **Pressure:** 672 mmhg

Test method used: SOP 8 Medium Accuracy Calibrations of Mass Standards by Modified Subtitution, May 2019

Test equipment used: Lab standards traceable to the SI, XPR64003LD5C, XPR5003SC, XPR226CDR, XPR36C, Vaisala PTU301

Condition of Weights: Suitable for use. No significant wear or damage

Artifact(s): **20 25 lb weights**

Nominal		Correction as Found	Correction as Left	NIST Class F	Uncertainty		Condition
	SN/ID	mg	mg	Tolerance (mg)	mg	*k*	As Left
25 lb	IPK5	-64	-64	1100	120	2.02	In-Tolerance
25 lb	IPK6	-239	-239	1100	120	2.02	In-Tolerance
25 lb	IPK8	-204	-204	1100	120	2.02	In-Tolerance
25 lb	IPK9	-334	-334	1100	120	2.02	In-Tolerance
25 lb	IPKC	-354	-354	1100	120	2.02	In-Tolerance
25 lb	IPKD	-1214	1	1100	120	2.02	Adjusted
25 lb	IPKE	676	676	1100	120	2.02	In-Tolerance
25 lb	IPKF	-319	-319	1100	120	2.02	In-Tolerance
25 lb	IPKG	26	26	1100	120	2.02	In-Tolerance
25 lb	IPKG	376	376	1100	120	2.02	In-Tolerance
25 lb	IPKH	-929	21	1100	120	2.02	Adjusted
25 lb	IPKH	76	76	1100	120	2.02	In-Tolerance
25 lb	IPKJ	-269	-269	1100	120	2.02	In-Tolerance
25 lb	IPKK	381	381	1100	120	2.02	In-Tolerance
25 lb	IPKL	-619	109	1100	120	2.02	Adjusted
25 lb	IPKM	-1639	-14	1100	120	2.02	Adjusted
25 lb	IPKN	41	41	1100	120	2.02	In-Tolerance
25 lb	IPKO	-539	-539	1100	120	2.02	In-Tolerance
25 lb	IPX2	-214	-214	1100	120	2.02	In-Tolerance
25 lb	KSD2	-634	-4	1100	120	2.02	Adjusted

* Adjusted artifacts are in tolerance. Rejected and Condemned artifacts were tagged and must be placed out of service.

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Treatment of artifacts prior to testing: Thermal equilibrium was obtained by placing the artifacts in the lab overnight

Ron E Peterson, Metrologist 10/23/2024 Dwight R Johnson, Reviewer 10/23/2024

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CALIBRATION CERTIFICATE

Calibrated for: K-Scale **Certificate number:** M25014

Calibration Date: 10/23/2024 **Purchase Order Number:**

Environmental conditions at time of test: Serial#

Temperature: 21.7 °C **Humidity:** 45 % **Pressure:** 671 mmhg

Test method used: SOP 8 Medium Accuracy Calibrations of Mass Standards by Modified Subtitution, May 2019

Test equipment used: Lab standards traceable to the SI, XPR64003LD5C, XPR5003SC, XPR226CDR, XPR36C, Vaisala PTU301

Condition of Weights: Suitable for use. No significant wear or damage

Artifact(s): **6 Loose Weights**

Nominal		Correction as Found	Correction as Left	NIST Class F	Uncertainty		Condition
	SN/ID	mg	mg	Tolerance (mg)	mg	*k*	As Left
20 lb	52	790	15	910	120	2.02	Adjusted
10 lb	Toledo	-30	-30	450	39	2.04	In-Tolerance
12 oz	8154	1.4	1.4	68	3.0	2.04	In-Tolerance
20 kg	Y	-465	-465	2500	200	2.02	In-Tolerance
5 kg	1E	-254	-254	500	43	2.04	In-Tolerance
300 g	8140	-4.6	-4.6	60	6.1	2.04	In-Tolerance

* Adjusted artifacts are in tolerance. Rejected and Condemned artifacts were tagged and must be placed out of service.

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Treatment of artifacts prior to testing: Thermal equilibrium was obtained by placing the artifacts in the lab overnight

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CALIBRATION CERTIFICATE

Calibrated for: K-Scale **Certificate number:** M25014

Calibration Date: 10/23/2024 **Purchase Order Number:**

Environmental conditions at time of test: Serial# O1AY

Temperature: 21.2 °C **Humidity:** 46.5 % **Pressure:** 670.3 mmhg

Test method used: SOP 8 Medium Accuracy Calibrations of Mass Standards by Modified Subtitution, May 2019

Test equipment used: Lab standards traceable to the SI, XPR64003LD5C, XPR5003SC, XPR226CDR, XPR36C, Vaisala PTU301

Condition of Weights: Suitable for use. No significant wear or damage

Artifact(s): **14 piece Metric Kit** **SN O1AY**

Nominal		Correction as Found	Correction as Left	NIST Class F	Uncertainty		Condition
	SN/ID	mg	mg	Tolerance (mg)	mg	*k*	As Left
2 kg		93	93	200	17	2.04	In-Tolerance
1 kg		42.0	42.0	100	8.7	2.04	In-Tolerance
500 g		35.5	35.5	70	6.1	2.04	In-Tolerance
200 g		16.4	16.4	40	3.4	2.04	In-Tolerance
200 g	.	15.5	15.5	40	3.4	2.04	In-Tolerance
100 g		7.5	7.5	20	1.7	2.04	In-Tolerance
50 g		3.38	3.38	10	0.86	2.04	In-Tolerance
20 g		1.10	1.10	4	0.34	2.04	In-Tolerance
20 g	.	1.00	1.00	4	0.34	2.04	In-Tolerance
10 g		0.93	0.93	2	0.17	2.04	In-Tolerance
5 g		0.43	0.43	1.5	0.13	2.04	In-Tolerance
2 g		0.206	0.206	1.1	0.095	2.04	In-Tolerance
2 g	.	0.321	0.321	1.1	0.095	2.04	In-Tolerance
1 g		-0.544	-0.544	0.9	0.078	2.04	In-Tolerance

* Adjusted artifacts are in tolerance. Rejected and Condemned artifacts were tagged and must be placed out of service.

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Treatment of artifacts prior to testing: Thermal equilibrium was obtained by placing the artifacts in the lab overnight

Ron E Peterson, Metrologist 10/23/2024 Dwight R Johnson, Reviewer 10/23/2024

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CALIBRATION CERTIFICATE

Calibrated for: K-Scale **Certificate number:** M25014

Calibration Date: 10/23/2024 **Purchase Order Number:**

Environmental conditions at time of test: Serial# 20BD

Temperature: 21.2 °C **Humidity:** 46.5 % **Pressure:** 670.3 mmhg

Test method used: SOP 8 Medium Accuracy Calibrations of Mass Standards by Modified Subtitution, May 2019

Test equipment used: Lab standards traceable to the SI, XPR64003LD5C, XPR5003SC, XPR226CDR, XPR36C, Vaisala PTU301

Condition of Weights: Suitable for use. No significant wear or damage

Artifact(s): **16 piece Metric Kit** **SN 20BD**

Nominal		Correction as Found	Correction as Left	NIST Class F	Uncertainty		Condition
	SN/ID	mg	mg	Tolerance (mg)	mg	*k*	As Left
5 kg		130	130	500	43	2.04	In-Tolerance
2 kg		81	81	200	17	2.04	In-Tolerance
2 kg	.	87	87	200	17	2.04	In-Tolerance
1 kg		50.0	50.0	100	8.7	2.04	In-Tolerance
500 g		26.5	26.5	70	6.1	2.04	In-Tolerance
200 g		17.2	17.2	40	3.4	2.04	In-Tolerance
200 g	.	16.3	16.3	40	3.4	2.04	In-Tolerance
100 g		1.7	1.7	20	1.7	2.04	In-Tolerance
50 g		2.39	2.39	10	0.86	2.04	In-Tolerance
20 g		0.96	0.96	4	0.34	2.04	In-Tolerance
20 g	.	0.62	0.62	4	0.34	2.04	In-Tolerance
10 g		0.64	0.64	2	0.17	2.04	In-Tolerance
5 g		0.17	0.17	1.5	0.13	2.04	In-Tolerance
2 g		0.441	0.441	1.1	0.095	2.04	In-Tolerance
2 g	.	0.341	0.341	1.1	0.095	2.04	In-Tolerance
1 g		0.087	0.087	0.9	0.078	2.04	In-Tolerance

* Adjusted artifacts are in tolerance. Rejected and Condemned artifacts were tagged and must be placed out of service.

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Treatment of artifacts prior to testing: Thermal equilibrium was obtained by placing the artifacts in the lab overnight

Ron E Peterson, Metrologist 10/23/2024 Dwight R Johnson, Reviewer 10/23/2024

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CALIBRATION CERTIFICATE

Calibrated for: K-Scale **Certificate number:** M25014

Calibration Date: 10/23/2024 **Purchase Order Number:**

Environmental conditions at time of test: Serial# 080602B

Temperature: 21.15 °C **Humidity:** 45.1 % **Pressure:** 671.7 mmhg

Test method used: SOP 8 Medium Accuracy Calibrations of Mass Standards by Modified Subtitution, May 2019

Test equipment used: Lab standards traceable to the SI, XPR64003LD5C, XPR5003SC, XPR226CDR, XPR36C, Vaisala PTU301

Condition of Weights: Suitable for use. No significant wear or damage

Artifact(s): **22 piece Metric Kit** **SN 080602B**

Nominal		Correction as Found	Correction as Left	NIST Class F	Uncertainty		Condition
	SN/ID	mg	mg	Tolerance (mg)	mg	*k*	As Left
2 kg	1	87	87	200	17	2.04	In-Tolerance
2 kg	2	89	89	200	17	2.04	In-Tolerance
2 kg	3	79	79	200	17	2.04	In-Tolerance
2 kg	4	89	89	200	17	2.04	In-Tolerance
2 kg	5	75	75	200	17	2.04	In-Tolerance
1 kg		41.0	41.0	100	8.7	2.04	In-Tolerance
500 g	1	32.5	32.5	70	6.1	2.04	In-Tolerance
500 g	2	31.5	31.5	70	6.1	2.04	In-Tolerance
500 g	3	13.5	13.5	70	6.1	2.04	In-Tolerance
500 g	4	29.5	29.5	70	6.1	2.04	In-Tolerance
500 g	5	32.5	32.5	70	6.1	2.04	In-Tolerance
200 g		12.7	12.7	40	3.4	2.04	In-Tolerance
200 g	.	10.7	10.7	40	3.4	2.04	In-Tolerance
100 g		9.8	9.8	20	1.7	2.04	In-Tolerance
50 g		4.14	4.14	10	0.86	2.04	In-Tolerance
20 g		1.18	1.18	4	0.34	2.04	In-Tolerance
20 g	.	1.85	1.85	4	0.34	2.04	In-Tolerance
10 g		0.00	0.00	2	0.17	2.04	In-Tolerance
5 g		0.91	0.91	1.5	0.13	2.04	In-Tolerance
2 g	.	0.486	0.486	1.1	0.095	2.04	In-Tolerance
2 g		-0.014	-0.014	1.1	0.095	2.04	In-Tolerance
1 g		-0.429	-0.429	0.9	0.078	2.04	In-Tolerance

* Adjusted artifacts are in tolerance. Rejected and Condemned artifacts were tagged and must be placed out of service.

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Treatment of artifacts prior to testing: Thermal equilibrium was obtained by placing the artifacts in the lab overnight

Ron E Peterson, Metrologist 10/23/2024 Dwight R Johnson, Reviewer 10/23/2024

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CALIBRATION CERTIFICATE

Calibrated for: K-Scale **Certificate number:** M25014

Calibration Date: 10/22/2024 **Purchase Order Number:**

Environmental conditions at time of test: Serial# 081500B

Temperature: 21.1 °C **Humidity:** 46.5 % **Pressure:** 670.2 mmhg

Test method used: SOP 8 Medium Accuracy Calibrations of Mass Standards by Modified Subtitution, May 2019

Test equipment used: Lab standards traceable to the SI, XPR64003LD5C, XPR5003SC, XPR226CDR, XPR36C, Vaisala PTU301

Condition of Weights: Suitable for use. No significant wear or damage

Artifact(s): **16 piece Avoirdupois Kit** **SN 081500B**

Nominal		Correction as Found	Correction as Left	NIST Class F	Uncertainty		Condition
	SN/ID	mg	mg	Tolerance (mg)	mg	*k*	As Left
10 lb	KS	-120	-120	450	39	2.04	In-Tolerance
10 lb	12	36	36	450	39	2.04	In-Tolerance
5 lb		24	24	230	20	2.04	In-Tolerance
1 lb	1	-5.6	-5.6	70	6.1	2.04	In-Tolerance
1 lb	3	6.5	6.5	70	6.1	2.04	In-Tolerance
1 lb	4	-15.6	-15.6	70	6.1	2.04	In-Tolerance
1 lb	5	16.5	16.5	70	6.1	2.04	In-Tolerance
1 lb	8	2.5	2.5	70	6.1	2.04	In-Tolerance
4 oz	1	7.3	7.3	23	2.0	2.03	In-Tolerance
4 oz	2	10.2	10.2	23	2.0	2.03	In-Tolerance
4 oz	3	0.1	0.1	23	2.0	2.03	In-Tolerance
1 oz	2	2.05	2.05	5.4	0.48	2.03	In-Tolerance
1 oz	3	1.84	1.84	5.4	0.48	2.03	In-Tolerance
0.5 oz		1.24	1.24	2.8	0.25	2.04	In-Tolerance
0.5 oz	.	0.22	0.22	2.8	0.25	2.04	In-Tolerance
0.25 oz		0.23	0.23	1.7	0.15	2.03	In-Tolerance

* Adjusted artifacts are in tolerance. Rejected and Condemned artifacts were tagged and must be placed out of service.

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Treatment of artifacts prior to testing: Thermal equilibrium was obtained by placing the artifacts in the lab overnight

Ron E Peterson, Metrologist 10/22/2024 Dwight R Johnson, Reviewer 10/22/2024

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CALIBRATION CERTIFICATE

Calibrated for: K-Scale **Certificate number:** M25014

Calibration Date: 10/22/2024 **Purchase Order Number:**

Environmental conditions at time of test: Serial# 081500C

Temperature: 21.1 °C **Humidity:** 46.5 % **Pressure:** 670.2 mmhg

Test method used: SOP 8 Medium Accuracy Calibrations of Mass Standards by Modified Subtitution, May 2019

Test equipment used: Lab standards traceable to the SI, XPR64003LD5C, XPR5003SC, XPR226CDR, XPR36C, Vaisala PTU301

Condition of Weights: Suitable for use. No significant wear or damage

Artifact(s): **16 piece Avoirdupois Kit** **SN 081500C**

Nominal		Correction as Found	Correction as Left	NIST Class F	Uncertainty		Condition
	SN/ID	mg	mg	Tolerance (mg)	mg	*k*	As Left
5 lb	6	27	27	230	20	2.04	In-Tolerance
2 lb	5	13.4	13.4	91	7.9	2.04	In-Tolerance
2 lb	6	30.4	30.4	91	7.9	2.04	In-Tolerance
1 lb	4	11.5	11.5	70	6.1	2.04	In-Tolerance
0.5 lb	3	4.2	4.2	45	4.0	2.04	In-Tolerance
0.2 lb	1	8.5	8.5	18	1.6	2.04	In-Tolerance
0.2 lb	2	8.3	8.3	18	1.6	2.04	In-Tolerance
0.1 lb		7.33	7.33	9.1	0.78	2.04	In-Tolerance
0.05 lb		2.28	2.28	4.5	0.39	2.04	In-Tolerance
0.02 lb		1.38	1.38	1.8	0.16	2.04	In-Tolerance
0.02 lb	.	0.83	0.83	1.8	0.16	2.04	In-Tolerance
0.01 lb		0.54	0.54	1.5	0.13	2.04	In-Tolerance
0.005 lb		0.86	0.86	1.2	0.10	2.05	In-Tolerance
0.002 lb		0.555	0.555	0.87	0.076	2.05	In-Tolerance
0.002 lb	.	0.695	0.695	0.87	0.076	2.05	In-Tolerance
0.001 lb		0.054	0.054	0.7	0.061	2.05	In-Tolerance

* Adjusted artifacts are in tolerance. Rejected and Condemned artifacts were tagged and must be placed out of service.

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Treatment of artifacts prior to testing: Thermal equilibrium was obtained by placing the artifacts in the lab overnight

Ron E Peterson, Metrologist 10/22/2024 Dwight R Johnson, Reviewer 10/22/2024

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CALIBRATION CERTIFICATE

Calibrated for: K-Scale **Certificate number:** M25014

Calibration Date: 10/23/2024 **Purchase Order Number:**

Environmental conditions at time of test: Serial# 180711

Temperature: 21.14 °C **Humidity:** 46.44 % **Pressure:** 670.26 mmhg

Test method used: SOP 8 Medium Accuracy Calibrations of Mass Standards by Modified Subtitution, May 2019

Test equipment used: Lab standards traceable to the SI, XPR64003LD5C, XPR5003SC, XPR226CDR, XPR36C, Vaisala PTU301

Condition of Weights: Suitable for use. No significant wear or damage

Artifact(s): **10 piece Avoirdupois Kit** **SN 180711**

Nominal		Correction as Found	Correction as Left	NIST Class F	Uncertainty		Condition
	SN/ID	mg	mg	Tolerance (mg)	mg	*k*	As Left
8 oz	1	10.2	10.2	45	4.0	2.04	In-Tolerance
8 oz	2	14.2	14.2	45	4.0	2.04	In-Tolerance
8 oz	3	19.2	19.2	45	4.0	2.04	In-Tolerance
8 oz	4	23.2	23.2	45	4.0	2.04	In-Tolerance
8 oz	5	17.2	17.2	45	4.0	2.04	In-Tolerance
8 oz	6	23.2	23.2	45	4.0	2.04	In-Tolerance
8 oz	7	21.2	21.2	45	4.0	2.04	In-Tolerance
8 oz	8	20.2	20.2	45	4.0	2.04	In-Tolerance
8 oz	9	14.2	14.2	45	4.0	2.04	In-Tolerance
8 oz	10	13.2	13.2	45	4.0	2.04	In-Tolerance

* Adjusted artifacts are in tolerance. Rejected and Condemned artifacts were tagged and must be placed out of service.

The values reported relate only to those observations made at the time and conditions of the test. This calibration certificate, so numbered, may not be reproduced, except in full, without approval of the laboratory. These weights were not screened for magnetism or checked for density, and effects of magnetism or density are not included in the uncertainties.

Treatment of artifacts prior to testing: Thermal equilibrium was obtained by placing the artifacts in the lab overnight

Ron E Peterson, Metrologist 10/23/2024 Dwight R Johnson, Reviewer 10/23/2024

South Dakota Department of Public Safety
Office of Weights and Measures
Metrology Lab
Lab: 1100 Otter Rd, Bldg. D Sturgis, SD 57785 Phone: 605-347-7541
Office: 118 West Capitol Avenue Pierre, SD 57501 Phone: 605-773-3697

CALIBRATION CERTIFICATE

Calibrated for: K-Scale **Certificate number:** M25014

Calibration Date: 10/22/2024 **Purchase Order Number:**

Environmental conditions at time of test: Serial# 081910A

Temperature: 21.05 °C **Humidity:** 45.75 % **Pressure:** 671.7 mmhg

Test method used: SOP 8 Medium Accuracy Calibrations of Mass Standards by Modified Subtitution, May 2019

Test equipment used: Lab standards traceable to the SI, XPR64003LD5C, XPR5003SC, XPR226CDR, XPR36C, Vaisala PTU301

Condition of Weights: Suitable for use. No significant wear or damage

Artifact(s): **18 piece Avoirdupois Kit** **SN 081910A**

Nominal		Correction as Found	Correction as Left	NIST Class F	Uncertainty		Condition
	SN/ID	mg	mg	Tolerance (mg)	mg	*k*	As Left
10 lb		120	120	450	39	2.04	In-Tolerance
10 lb	.	129	129	450	39	2.04	In-Tolerance
5 lb		80	80	230	20	2.04	In-Tolerance
5 lb		33	33	230	20	2.04	In-Tolerance
2 lb		29.4	29.4	91	7.9	2.04	In-Tolerance
2 lb	.	10.4	10.4	91	7.9	2.04	In-Tolerance
1 lb		10.5	10.5	70	6.1	2.04	In-Tolerance
0.5 lb		0.7	0.7	45	4.0	2.04	In-Tolerance
0.2 lb		3.1	3.1	18	1.6	2.04	In-Tolerance
0.2 lb	.	3.2	3.2	18	1.6	2.04	In-Tolerance
0.1 lb		1.39	1.39	9.1	0.78	2.04	In-Tolerance
0.05 lb		0.46	0.46	4.5	0.39	2.04	In-Tolerance
0.02 lb		0.46	0.46	1.8	0.16	2.04	In-Tolerance
0.02 lb	.	0.39	0.39	1.8	0.16	2.04	In-Tolerance
0.01 lb		0.70	0.70	1.5	0.13	2.04	In-Tolerance
0.005 lb		0.21	0.21	1.2	0.10	2.05	In-Tolerance
0.002 lb	.	0.295	0.295	0.87	0.076	2.05	In-Tolerance
0.001 lb		0.379	0.379	0.7	0.061	2.05	In-Tolerance

* Adjusted artifacts are in tolerance. Rejected and Condemned artifacts were tagged and must be placed out of service.

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