

**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**

<b>K-Scale</b>	SA# <b>90</b>	Certificate number: <b>MP4321</b>
Physical Address:	Billing Address:	
<b>1701 W Madison</b>	<b>1701 W Madison</b>	
<b>Sioux Falls, SD 57104</b>	<b>Sioux Falls, SD 57104</b>	
Contact: <b>Kevin Baumgartner</b>		Received Date: <b>10/24/2022</b>
Phone: <b>605-334-8003</b>		Certificate Issued: <b>10/25/2022</b>

**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	1	1	0	1
1	3000 lb weight cart	1	1	1	0	1
43	1000 lb Weights	43	39	7	0	43
4	500 lb Weights	4	2	3	0	4
70	50 lb Weights	70	33	28	0	70
49	25 lb Weights	49	41	16	0	49
8	Kits/loose sets	116	116	0	0	116

**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.

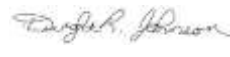
**Conformity Statement:** The artifacts submitted for this calibration are calibrated to NIST Handbook 105-1 (1990 or 2019), NIST Handbook 105-8 (2019), NIST Handbook 105-3 (2010), or ASTM E617 (2018), Standard Specification for Laboratory Weights and Precision Mass Standards specifications. The reported 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 document to claim product endorsement by this laboratory.

  
 \_\_\_\_\_  
 Ron E Peterson, Metrologist

10/25/2022

  
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 Dwight R Johnson, Reviewer

10/25/2022



South Dakota Department of Public Safety  
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Metrology Lab  
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## CALIBRATION CERTIFICATE

Calibrated for: **K-Scale** Certificate Number: **MP4321**  
Calibration Date: **10/27/2022**

### Environmental conditions at time of test:

Temperature: 20 °C Humidity: 45.3 % Pressure: 668.2 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

SN: 16592B

Nominal (lb)	AS Found (lb)	As Found (g)	As Left (lb)	As Left (g)	Uncertainty (lb)	<i>k</i>	Tolerance (lb)	Condition as Left
4000	0.56	253.46	0.10	45.59	0.13	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 re-calibration 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.

 10/25/2022

Ron E Peterson, Metrologist

Ver 20220919



### Inspection Checklist for Weight Cart

Calibrated for: K-Scale Certificate number: MP4321  
 Calibration Date: 10/27/2022

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

<input checked="" type="checkbox"/>	Nominal Mass of Weight Cart	4000 lbs	Suitably marked: Yes/No	<b>Yes</b>
<input checked="" type="checkbox"/>	Powered by:	Electric/generator	Diesel <input type="checkbox"/>	Gasoline <input checked="" type="checkbox"/>
<input checked="" type="checkbox"/>	Fluid Levels:	Engine Oil	<input checked="" type="checkbox"/>	
		Hydraulic Fluid	<input checked="" type="checkbox"/>	Sealed: Yes/No
		Battery	<input checked="" type="checkbox"/>	<b>Yes</b>
		Liquid Fuel	<input checked="" type="checkbox"/>	Sealed: Yes/No
			Reference Line Present: Yes/No	<b>Yes</b>
<input checked="" type="checkbox"/>	Fluid drain tubes extend beyond the body of the cart: Yes/No		<b>Yes</b>	
<input checked="" type="checkbox"/>	Number of axles:	<b>2</b>		
<input checked="" type="checkbox"/>	Number /Size of Tires	<b>21x7x15</b>		
<input checked="" type="checkbox"/>	Sealed wheel bearings: Yes/No	<b>Yes</b>		
<input checked="" type="checkbox"/>	Drain holes present in locations where water may accumulate: Yes/No		<b>Yes</b>	
<input checked="" type="checkbox"/>	Weight restraint railing permanently fixed and solid: Yes/No		<b>Yes</b>	
<input checked="" type="checkbox"/>	Adjusting cavity accessible: Yes/No	<b>Yes</b>	Approximate capacity:(lbs)	<b>150</b>
<input checked="" type="checkbox"/>	Adjusting cavity sealed: Yes/No	<b>Yes</b>		
<input checked="" type="checkbox"/>	Service brakes functioning properly: Yes/No		<b>Yes</b>	
<input checked="" type="checkbox"/>	Parking brakes functioning properly: Yes/No		<b>Yes</b>	
<input type="checkbox"/>	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.

 10/27/2022

Ron Peterson, Metrologist  
 Ver 20220919



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### CALIBRATION CERTIFICATE

Calibrated for: **K-Scale** Certificate Number: **MP4321**  
 Calibration Date: **10/25/2022**

**Environmental conditions at time of test:**

Temperature: 19.8 °C Humidity: 44.8 % Pressure: 665.3 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: Dunbar SN: 15133545

Nominal (lb)	AS Found (lb)	As Found (g)	As Left (lb)	As Left (g)	Uncertainty (lb)	k	Tolerance (lb)	Condition as Left
3000	0.76	344.16	0.12	56.59	0.14	2.01	1.05	Adjusted

**Notes:**

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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 re-calibration 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.



10/25/2022

Ron E Peterson, Metrologist



### Inspection Checklist for Weight Cart

Calibrated for: K-Scale Certificate number: MP4321  
 Calibration Date: 10/27/2022

Manufacturer: **Dunbar** Date of Manufacture: **unk**  
 Model Number: **WM-20** ID/SN Number: **15133545**

<input checked="" type="checkbox"/>	Nominal Mass of Weight Cart	3000 lbs	Suitably marked: Yes/No	<b>Yes</b>
<input checked="" type="checkbox"/>	Powered by:	Electric/generator	Diesel <input type="checkbox"/>	Gasoline <input checked="" type="checkbox"/>
<input checked="" type="checkbox"/>	Fluid Levels:	Engine Oil	<input checked="" type="checkbox"/>	
		Hydraulic Fluid	<input checked="" type="checkbox"/>	Sealed: Yes/No
		Battery	<input checked="" type="checkbox"/>	<b>Yes</b>
		Liquid Fuel	<input checked="" type="checkbox"/>	Sealed: Yes/No
			Reference Line Present: Yes/No	<b>Yes</b>
<input checked="" type="checkbox"/>	Fluid drain tubes extend beyond the body of the cart: Yes/No		<b>Yes</b>	
<input checked="" type="checkbox"/>	Number of axles:	<b>2</b>		
<input checked="" type="checkbox"/>	Number /Size of Tires	<b>21x9x15</b>		
<input checked="" type="checkbox"/>	Sealed wheel bearings: Yes/No	<b>Yes</b>		
<input checked="" type="checkbox"/>	Drain holes present in locations where water may accumulate: Yes/No		<b>Yes</b>	
<input checked="" type="checkbox"/>	Weight restraint railing permanently fixed and solid: Yes/No		<b>Yes</b>	
<input checked="" type="checkbox"/>	Adjusting cavity accessible: Yes/No	<b>Yes</b>	Approximate capacity:(lbs)	<b>75 lb</b>
<input checked="" type="checkbox"/>	Adjusting cavity sealed: Yes/No	<b>Yes</b>		
<input checked="" type="checkbox"/>	Service brakes functioning properly: Yes/No		<b>Yes</b>	
<input checked="" type="checkbox"/>	Parking brakes functioning properly: Yes/No		<b>Yes</b>	
<input type="checkbox"/>	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.

 10/25/2022

Ron Peterson, Metrologist  
 Ver 20220919



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Metrology Lab  
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Office: 118 West Capitol Avenue Pierre, SD 57501 Phone: 605-773-3697



## CALIBRATION CERTIFICATE

Calibrated for: **K-Scale** Certificate number: **MP4321**  
 Calibration Date: **10/25/2022** Purchase Order Number: **0**  
 Environmental conditions at time of test:  
**Temperature: 20.1 °C Humidity: 45.6 % Pressure: 665.7 mmhg**  
**Test method used: SOP 8 Medium Accuracy Calibrations of Mass Standards by Modified Substitution, 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): 24 - 1000 lb weights**

Nominal	SN/ID	Correction as Found		Correction as Left		NIST Class F Tolerance (g)	Uncertainty g	k	Condition As Left
		lb	g	lb	g				
1000 lb	1	-0.02	-9.6	-0.02	-9.6	45	4.8	2.0	In-Tolerance
1000 lb	2	0.00	-1.8	0.00	-1.8	45	4.8	2.0	In-Tolerance
1000 lb	3	0.05	21.3	0.05	21.3	45	4.8	2.0	In-Tolerance
1000 lb	4	-0.02	-6.9	-0.02	-6.9	45	4.8	2.0	In-Tolerance
1000 lb	5	0.08	37.2	0.00	-0.1	45	4.8	2.0	Adjusted
1000 lb	6	0.02	8.9	0.02	8.9	45	4.8	2.0	In-Tolerance
1000 lb	7	-0.04	-18.6	-0.04	-18.6	45	4.8	2.0	In-Tolerance
1000 lb	8	-0.07	-30.8	0.00	-0.2	45	4.8	2.0	Adjusted
1000 lb	9	-0.16	-72.4	0.00	0.0	45	4.8	2.0	Adjusted
1000 lb	10	0.00	-0.4	0.00	-0.4	45	4.8	2.0	In-Tolerance
1000 lb	11	0.01	6.1	0.01	6.1	45	4.8	2.0	In-Tolerance
1000 lb	12	0.09	42.0	0.00	0.0	45	4.8	2.0	Adjusted
1000 lb	13	0.06	25.4	0.06	25.4	45	4.8	2.0	In-Tolerance
1000 lb	14	0.04	16.9	0.04	16.9	45	4.8	2.0	In-Tolerance
1000 lb	15	-0.04	-20.1	-0.04	-20.1	45	4.8	2.0	In-Tolerance
1000 lb	17	-0.02	-11.0	-0.02	-11.0	45	4.8	2.0	In-Tolerance
1000 lb	19	0.10	45.3	0.00	-0.1	45	4.8	2.0	Adjusted
1000 lb	20	-0.01	-6.6	-0.01	-6.6	45	4.8	2.0	In-Tolerance
1000 lb	21	0.00	1.7	0.00	1.7	45	4.8	2.0	In-Tolerance
1000 lb	23	0.04	17.0	0.04	17.0	45	4.8	2.0	In-Tolerance
1000 lb	24	0.04	15.9	0.04	15.9	45	4.8	2.0	In-Tolerance
1000 lb	25	-0.04	-17.1	-0.04	-17.1	45	4.8	2.0	In-Tolerance
1000 lb	28	-0.02	-10.2	-0.02	-10.2	45	4.8	2.0	In-Tolerance
1000 lb	122	-0.03	-15.7	-0.03	-15.7	45	4.8	2.0	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

 10/25/2022

Ron E Peterson, Metrologist

Ver 20220919









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## CALIBRATION CERTIFICATE

Calibrated for: **K-Scale** Certificate number: **MP4321**

Calibration Date: **10/25/2022** Purchase Order Number: **0**

**Environmental conditions at time of test:**

**Temperature:** 20 °C      **Humidity:** 44.1 %      **Pressure:** 665.9 mmhg

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

**Test equipment used:** Lab standards traceable to the SI, Mettler XPR5003SC, Mettler XPR226CDR, Mettler AX206, Vaisala PTU301

**Condition of Weights:** Cleaned and painted

Artifact(s): **24 25 lb weights**

Nominal	SN/ID	Correction as Found mg	Correction as Left mg	NIST Class F Tolerance (mg)	Uncertainty mg	k	Condition As Left
25 lb	2	-304	-304	1100	110	2.20	In-Tolerance
25 lb	56	-244	-244	1100	110	2.20	In-Tolerance
25 lb	57	-254	-254	1100	110	2.20	In-Tolerance
25 lb	1PJ1	-1154	16	1100	110	2.20	Adjusted
25 lb	1PJ4	446	446	1100	110	2.20	In-Tolerance
25 lb	1PJ9	-644	6	1100	110	2.20	Adjusted
25 lb	1PJA	166	166	1100	110	2.20	In-Tolerance
25 lb	1PJB	-424	-424	1100	110	2.20	In-Tolerance
25 lb	1PJD	-1044	-4	1100	110	2.20	Adjusted
25 lb	1PJE	456	456	1100	110	2.20	In-Tolerance
25 lb	1PJG	246	246	1100	110	2.20	In-Tolerance
25 lb	1PJJ	1076	26	1100	110	2.20	Adjusted
25 lb	1PJL	386	386	1100	110	2.20	In-Tolerance
25 lb	1PJM	126	126	1100	110	2.20	In-Tolerance
25 lb	1PJN	516	516	1100	110	2.20	In-Tolerance
25 lb	1PJO	-544	-544	1100	110	2.20	In-Tolerance
25 lb	1PJP	-374	-374	1100	110	2.20	In-Tolerance
25 lb	1PJR	-954	6	1100	110	2.20	Adjusted
25 lb	1PJS	-494	-494	1100	110	2.20	In-Tolerance
25 lb	1PJT	286	286	1100	110	2.20	In-Tolerance
25 lb	1PJV	116	116	1100	110	2.20	In-Tolerance
25 lb	1PJW	-464	-464	1100	110	2.20	In-Tolerance
25 lb	1PJX	-434	-434	1100	110	2.20	In-Tolerance
25 lb	1PJZ	-904	16	1100	110	2.20	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

 10/25/2022

Ron E Peterson, Metrologist  
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## CALIBRATION CERTIFICATE

Calibrated for: **K-Scale** Certificate number: **MP4321**  
 Calibration Date: **10/25/2022** Purchase Order Number: **0**

**Environmental conditions at time of test:**

**Temperature:** 20 °C **Humidity:** 44.1 % **Pressure:** 665.9 mmhg

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

**Test equipment used:** Lab standards traceable to the SI, Mettler XPR5003SC, Mettler XPR226CDR, Mettler AX206, Vaisala PTU301

**Condition of Weights:** Cleaned and painted

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

Nominal	SN/ID	Correction as Found	Correction as Left	NIST Class F	Uncertainty	k	Condition As Left
		mg	mg	Tolerance (mg)	mg		
25 lb	1PK11	286	286	1100	110	2.20	In-Tolerance
25 lb	1PK1L	-234	-234	1100	110	2.20	In-Tolerance
25 lb	1PK2	-1154	26	1100	110	2.20	Adjusted
25 lb	1PK3	316	316	1100	110	2.20	In-Tolerance
25 lb	1PK4	-384	-384	1100	110	2.20	In-Tolerance
25 lb	1PK5	-1104	26	1100	110	2.20	Adjusted
25 lb	1PK6	-1834	-4	1100	110	2.20	Adjusted
25 lb	1PK7	-334	-334	1100	110	2.20	In-Tolerance
25 lb	1PK8	-604	6	1100	110	2.20	Adjusted
25 lb	1PK9	1036	6	1100	110	2.20	Adjusted
25 lb	1PKC	-1334	16	1100	110	2.20	Adjusted
25 lb	1PKD	106	106	1100	110	2.20	In-Tolerance
25 lb	1PKE	696	696	1100	110	2.20	In-Tolerance
25 lb	1PKF	-564	216	1100	110	2.20	Adjusted
25 lb	1PKG	-634	-4	1100	110	2.20	Adjusted
25 lb	1PKH	846	6	1100	110	2.20	Adjusted
25 lb	1PKJ	-44	-44	1100	110	2.20	In-Tolerance
25 lb	1PKK	616	616	1100	110	2.20	In-Tolerance
25 lb	1PKL	-284	-284	1100	110	2.20	In-Tolerance
25 lb	1PKM	336	336	1100	110	2.20	In-Tolerance
25 lb	1PKN	-274	-274	1100	110	2.20	In-Tolerance
25 lb	1PKO	406	406	1100	110	2.20	In-Tolerance
25 lb	1RJF	186	186	1100	110	2.20	In-Tolerance
25 lb	X	-384	-384	1100	110	2.20	In-Tolerance
25 lb	KS-D2	-634	16	1100	110	2.20	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

 10/25/2022

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## CALIBRATION CERTIFICATE

**Calibrated for:** K-Scale **Certificate number:** MP4321

**Calibration Date:** 10/25/2022 **Purchase Order Number:** 0

**Environmental conditions at time of test:**

**Temperature:** 20 °C      **Humidity:** 44.1 %      **Pressure:** 665.9 mmhg

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

**Test equipment used:** Lab standards traceable to the SI, Mettler XPR5003SC, Mettler XPR226CDR, Mettler AX206, Vaisala PTU301

**Condition of Weights:** Cleaned and painted

Artifact(s): **4 Cast Weights**

Nominal	SN/ID	Correction as Found mg	Correction as Left mg	NIST Class F Tolerance (mg)	Uncertainty mg	k	Condition As Left
20 lb	57	44	44	910	110	2.20	In-Tolerance
10 lb	58	-446	-5	450	39	2.07	Adjusted
20 kg	Y	-110	-110	2000	210	2.10	In-Tolerance
5 kg	1E	-62	-62	500	44	2.07	In-Tolerance

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## CALIBRATION CERTIFICATE

Calibrated for: **K-Scale** Certificate number: **MP4321**

Calibration Date: **10/25/2022** Purchase Order Number: **0**

**Environmental conditions at time of test:**

**Temperature:** 19.9 °C      **Humidity:** 45.2 %      **Pressure:** 665.9 mmhg

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

**Test equipment used:** Lab standards traceable to the SI, Mettler XPR5003SC, Mettler XPR226CDR, Mettler AX206, Vaisala PTU301

**Condition of Weights:** Cleaned and painted

Artifact(s): **25 50 lb weights**

Nominal	SN/ID	Correction as Found mg	Correction as Left mg	NIST Class F Tolerance (mg)	Uncertainty mg	k	Condition As Left
50 lb	K3-C44	-1138	-1138	2300	210	2.10	In-Tolerance
50 lb	1	-2798	-8	2300	210	2.10	Adjusted
50 lb	2	-2588	-8	2300	210	2.10	Adjusted
50 lb	3	-1288	12	2300	210	2.10	Adjusted
50 lb	3	-1678	102	2300	210	2.10	Adjusted
50 lb	4	-618	-618	2300	210	2.10	In-Tolerance
50 lb	5	-1598	-8	2300	210	2.10	Adjusted
50 lb	6	-1088	-1088	2300	210	2.10	In-Tolerance
50 lb	6	-1518	12	2300	210	2.10	Adjusted
50 lb	7	-248	-248	2300	210	2.10	In-Tolerance
50 lb	8	-1148	-1148	2300	210	2.10	In-Tolerance
50 lb	10	-1088	-1088	2300	210	2.10	In-Tolerance
50 lb	11	-2158	2	2300	210	2.10	Adjusted
50 lb	13	-2218	12	2300	210	2.10	Adjusted
50 lb	15	-958	-958	2300	210	2.10	In-Tolerance
50 lb	16	-1138	-1138	2300	210	2.10	In-Tolerance
50 lb	17	-2398	2	2300	210	2.10	Adjusted
50 lb	18	-1998	-8	2300	210	2.10	Adjusted
50 lb	20	-1138	-1138	2300	210	2.10	In-Tolerance
50 lb	20	-1578	2	2300	210	2.10	Adjusted
50 lb	21	-648	-648	2300	210	2.10	In-Tolerance
50 lb	22	-3068	12	2300	210	2.10	Adjusted
50 lb	24	-458	-458	2300	210	2.10	In-Tolerance
50 lb	25	-1098	-1098	2300	210	2.10	In-Tolerance
50 lb	27	-1138	-1138	2300	210	2.10	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

 10/25/2022

Ron E Peterson, Metrologist  
Ver 20220919



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: **MP4321**

Calibration Date: **10/25/2022** Purchase Order Number: **0**

**Environmental conditions at time of test:**

**Temperature:** 19.9 °C      **Humidity:** 45.2 %      **Pressure:** 665.9 mmhg

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

**Test equipment used:** Lab standards traceable to the SI, Mettler XPR5003SC, Mettler XPR226CDR, Mettler AX206, Vaisala PTU301

**Condition of Weights:** Cleaned and painted

Artifact(s): **25 50 lb weights**

Nominal	SN/ID	Correction as Found	Correction as Left	NIST Class F	Uncertainty	k	Condition As Left
		mg	mg	Tolerance (mg)	mg		
50 lb	28	-808	-808	2300	210	2.10	In-Tolerance
50 lb	31	-1088	-1088	2300	210	2.10	In-Tolerance
50 lb	32	-958	-958	2300	210	2.10	In-Tolerance
50 lb	33	-2338	12	2300	210	2.10	Adjusted
50 lb	36	-3168	-18	2300	210	2.10	Adjusted
50 lb	39	-1108	-1108	2300	210	2.10	In-Tolerance
50 lb	40	-2028	2	2300	210	2.10	Adjusted
50 lb	41	-238	-238	2300	210	2.10	In-Tolerance
50 lb	45	-4258	-8	2300	210	2.10	Adjusted
50 lb	47	-2118	-18	2300	210	2.10	Adjusted
50 lb	48	-2468	22	2300	210	2.10	Adjusted
50 lb	50	-2248	12	2300	210	2.10	Adjusted
50 lb	51	-858	-858	2300	210	2.10	In-Tolerance
50 lb	52	-868	-868	2300	210	2.10	In-Tolerance
50 lb	53	-1928	22	2300	210	2.10	Adjusted
50 lb	97	172	172	2300	210	2.10	In-Tolerance
50 lb	98	-438	-438	2300	210	2.10	In-Tolerance
50 lb	99	-1068	-1068	2300	210	2.10	In-Tolerance
50 lb	321	-668	-668	2300	210	2.10	In-Tolerance
50 lb	333	-3458	-8	2300	210	2.10	Adjusted
50 lb	11M	-2108	2	2300	210	2.10	Adjusted
50 lb	L	-1138	-1138	2300	210	2.10	In-Tolerance
50 lb	M	-1058	-1058	2300	210	2.10	In-Tolerance
50 lb	R	-888	-888	2300	210	2.10	In-Tolerance
50 lb	X	-618	-618	2300	210	2.10	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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10/25/2022

Ron E Peterson, Metrologist  
Ver 20220919



South Dakota Department of Public Safety  
Office of Weights and Measures  
Metrology Lab  
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Office: 118 West Capitol Avenue Pierre, SD 57501 Phone: 605-773-3697



## CALIBRATION CERTIFICATE

Calibrated for: **K-Scale** Certificate number: **MP4321**  
 Calibration Date: **10/25/2022** Purchase Order Number: **0**

**Environmental conditions at time of test:**

**Temperature:** 19.9 °C      **Humidity:** 45.2 %      **Pressure:** 665.9 mmhg

**Test method used:** SOP 8 Medium Accuracy Calibrations of Mass Standards by Modified Substitution, May 2019  
**Test equipment used:** Lab standards traceable to the SI, Mettler XPR5003SC, Mettler XPR226CDR, Mettler AX206, Vaisala PTU301  
**Condition of Weights:** Cleaned and painted

Artifact(s):      **20 -50 lb Hanging Weights**

Nominal	SN/ID	Correction as Found mg	Correction as Left mg	NIST Class F Tolerance (mg)	Uncertainty mg	k	Condition As Left
50 lb	12	-578	-578	2300	210	2.10	In-Tolerance
50 lb	46	152	152	2300	210	2.10	In-Tolerance
50 lb	50	-48	-48	2300	210	2.10	In-Tolerance
50 lb	59	-28	-28	2300	210	2.10	In-Tolerance
50 lb	SD	-698	-698	2300	210	2.10	In-Tolerance
50 lb	SD1	1062	1062	2300	210	2.10	In-Tolerance
50 lb	SD21	-288	-288	2300	210	2.10	In-Tolerance
50 lb	SD25	-588	-588	2300	210	2.10	In-Tolerance
50 lb	SD26	22	22	2300	210	2.10	In-Tolerance
50 lb	SD32	-168	-168	2300	210	2.10	In-Tolerance
50 lb	SD33	912	912	2300	210	2.10	In-Tolerance
50 lb	SD34	3412	-8	2300	210	2.10	Adjusted
50 lb	SD37	-1688	22	2300	210	2.10	Adjusted
50 lb	SD38	302	302	2300	210	2.10	In-Tolerance
50 lb	SD39	-858	-858	2300	210	2.10	In-Tolerance
50 lb	SD47	-3768	12	2300	210	2.10	Adjusted
50 lb	SD48	242	242	2300	210	2.10	In-Tolerance
50 lb	SD49	-2418	12	2300	210	2.10	Adjusted
50 lb	SD55	-1778	2	2300	210	2.10	Adjusted
50 lb	SD8	-2368	2	2300	210	2.10	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

     10/25/2022

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## CALIBRATION CERTIFICATE

**Calibrated for:** K-Scale **Certificate number:** MP4321  
**Calibration Date:** 10/26/2022 **Purchase Order Number:** 0

**Environmental conditions at time of test:**  
**Temperature:** 20.8 °C **Humidity:** 46.3 % **Pressure:** 666.8 mmhg

**Test method used:** SOP 8 Medium Accuracy Calibrations of Mass Standards by Modified Substitution, May 2019  
**Test equipment used:** Lab standards traceable to the SI, Mettler XPR5003SC, Mettler XPR226CDR, Mettler AX206, Vaisala PTU301  
**Condition of Weights:** Suitable for use. No significant wear or damage

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

Nominal	SN/ID	Correction as Found	Correction as Left	NIST Class F	Uncertainty	k	Condition As Left
		mg	mg	Tolerance (mg)	mg		
5 lb	9	27	27	230	20	2.07	In-Tolerance
2 lb	5	10	10	91	8.0	2.07	In-Tolerance
2 lb	6	27	27	91	8.0	2.07	In-Tolerance
1 lb	4	11	11	70	6.2	2.07	In-Tolerance
0.5 lb	3	3	3	45	4.1	2.06	In-Tolerance
0.2 lb	1	8.5	8.5	18	1.6	2.07	In-Tolerance
0.2 lb	2	8.3	8.3	18	1.6	2.07	In-Tolerance
0.1 lb		7.3	7.3	9.1	0.79	2.07	In-Tolerance
0.05 lb		2.3	2.3	4.5	0.39	2.07	In-Tolerance
0.02 lb		1.38	1.38	1.8	0.16	2.06	In-Tolerance
0.02 lb		0.82	0.82	1.8	0.16	2.06	In-Tolerance
0.01 lb		0.54	0.54	1.5	0.13	2.06	In-Tolerance
0.005 lb		0.70	0.70	1.2	0.23	2.05	In-Tolerance
0.002 lb		0.58	0.58	0.87	0.14	2.06	In-Tolerance
0.002 lb		0.71	0.71	0.87	0.14	2.06	In-Tolerance
0.001 lb		0.059	0.059	0.7	0.065	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

10/25/2022

Ron E Peterson, Metrologist  
 Ver 20220919



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 Office of Weights and Measures  
 Metrology Lab  
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 Office: 118 West Capitol Avenue Pierre, SD 57501 Phone: 605-773-3697



### CALIBRATION CERTIFICATE

Calibrated for: **K-Scale** Certificate number: **MP4321**  
 Calibration Date: **10/26/2022** Purchase Order Number: **0**

**Environmental conditions at time of test:**

**Temperature:** 21 °C      **Humidity:** 45.6 %      **Pressure:** 666.6 mmhg

**Test method used:** SOP 8 Medium Accuracy Calibrations of Mass Standards by Modified Substitution, May 2019  
**Test equipment used:** Lab standards traceable to the SI, Mettler XPR5003SC, Mettler XPR226CDR, Mettler AX206, Vaisala PTU301  
**Condition of Weights:** Suitable for use. No significant wear or damage

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

Nominal	SN/ID	Correction as Found mg	Correction as Left mg	NIST Class F Tolerance (mg)	Uncertainty mg	<i>k</i>	Condition As Left
10 lb	KS	-120	-120	450	39	2.07	In-Tolerance
10 lb		36	36	450	39	2.07	In-Tolerance
5 lb		23	23	230	20	2.07	In-Tolerance
1 lb	KS1	-6.6	-6.6	70	6.2	2.07	In-Tolerance
1 lb	KS3	4.5	4.5	70	6.2	2.07	In-Tolerance
1 lb	4	-16.6	-16.6	70	6.2	2.07	In-Tolerance
1 lb	5	15.5	15.5	70	6.2	2.07	In-Tolerance
1 lb	8	1.5	1.5	70	6.2	2.07	In-Tolerance
4 oz	KS1	7.5	7.5	23	2.0	2.05	In-Tolerance
4 oz	KS2	10.4	10.4	23	2.0	2.05	In-Tolerance
4 oz	KS3	0.2	0.2	23	2.0	2.05	In-Tolerance
1 oz	2	2.06	2.06	5.4	0.48	2.04	In-Tolerance
1 oz	3	1.83	1.83	5.4	0.48	2.04	In-Tolerance
1/2 oz		1.26	1.26	2.8	0.25	2.06	In-Tolerance
1/2 oz		0.20	0.20	2.8	0.25	2.06	In-Tolerance
1/4 oz		0.23	0.23	1.7	0.15	2.04	In-Tolerance

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

 10/25/2022

Ron E Peterson, Metrologist  
 Ver 20220919





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## CALIBRATION CERTIFICATE

Calibrated for: **K-Scale** Certificate number: **MP4321**  
 Calibration Date: **10/26/2022** Purchase Order Number: **0**

**Environmental conditions at time of test:**

**Temperature:** 20.8 °C      **Humidity:** 46.4 %      **Pressure:** 666.6 mmhg

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

**Test equipment used:** Lab standards traceable to the SI, Mettler XPR5003SC, Mettler XPR226CDR, Mettler AX206, Vaisala PTU301

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

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

Nominal	SN/ID	Correction as Found mg	Correction as Left mg	NIST Class F Tolerance (mg)	Uncertainty mg	k	Condition As Left
10 lb		122	122	450	39	2.07	In-Tolerance
10 lb	.	128	128	450	39	2.07	In-Tolerance
5 lb		80	80	230	20	2.07	In-Tolerance
2 lb		31.4	31.4	91	8.0	2.07	In-Tolerance
2 lb	.	26.4	26.4	91	8.0	2.07	In-Tolerance
1 lb		8.5	8.5	70	6.2	2.07	In-Tolerance
0.5 lb		11.2	11.2	45	4.1	2.06	In-Tolerance
0.2 lb		0.6	0.6	18	1.6	2.07	In-Tolerance
0.2 lb	.	3.3	3.3	18	1.6	2.07	In-Tolerance
0.1 lb		3.24	3.24	9.1	0.79	2.07	In-Tolerance
0.05 lb		1.42	1.42	4.5	0.39	2.07	In-Tolerance
0.02 lb		0.47	0.47	1.8	0.16	2.06	In-Tolerance
0.02 lb	.	0.46	0.46	1.8	0.16	2.06	In-Tolerance
0.01 lb		0.38	0.38	1.5	0.13	2.06	In-Tolerance
0.005 lb		0.70	0.70	1.2	0.23	2.05	In-Tolerance
0.002 lb		0.27	0.27	0.87	0.14	2.06	In-Tolerance
0.002 lb	.	0.29	0.29	0.87	0.14	2.06	In-Tolerance
0.001 lb		0.389	0.389	0.7	0.065	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

      10/25/2022

Ron E Peterson, Metrologist  
Ver 20220919



South Dakota Department of Public Safety  
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### CALIBRATION CERTIFICATE

Calibrated for: **K-Scale** Certificate number: **MP4321**  
 Calibration Date: **10/26/2022** Purchase Order Number: **0**

Environmental conditions at time of test:

Temperature: 20.9 °C      Humidity: 45.4 %      Pressure: 667 mmhg

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

Test equipment used: Lab standards traceable to the SI, Mettler XPR5003SC, Mettler XPR226CDR, Mettler AX206, Vaisala PTU301

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

Artifact(s): **10 piece Avoirdupois Kit** **SN SD180711**

Nominal	SN/ID	Correction as Found	Correction as Left	NIST Class F	Uncertainty	k	Condition As Left
		mg	mg	Tolerance (mg)	mg		
8 oz	1	11.2	11.2	45	4.1	2.06	In-Tolerance
8 oz	2	13.2	13.2	45	4.1	2.06	In-Tolerance
8 oz	3	19.2	19.2	45	4.1	2.06	In-Tolerance
8 oz	4	24.2	24.2	45	4.1	2.06	In-Tolerance
8 oz	5	17.2	17.2	45	4.1	2.06	In-Tolerance
8 oz	6	23.2	23.2	45	4.1	2.06	In-Tolerance
8 oz	7	20.2	20.2	45	4.1	2.06	In-Tolerance
8 oz	8	19.2	19.2	45	4.1	2.06	In-Tolerance
8 oz	9	14.2	14.2	45	4.1	2.06	In-Tolerance
8 oz	10	12.2	12.2	45	4.1	2.06	In-Tolerance

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

 10/25/2022

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### CALIBRATION CERTIFICATE

Calibrated for: **K-Scale** Certificate number: **MP4321**

Calibration Date: **10/26/2022** Purchase Order Number: **0**

**Environmental conditions at time of test:**

Temperature: 21.1 °C Humidity: 44.6 % Pressure: 666.5 mmhg

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

Test equipment used: Lab standards traceable to the SI, Mettler XPR5003SC, Mettler XPR226CDR, Mettler AX206, Vaisala PTU301

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

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

Nominal	SN/ID	Correction as Found mg	Correction as Left mg	NIST Class F Tolerance (mg)	Uncertainty mg	k	Condition As Left
5 kg		130	130	500	44	2.07	In-Tolerance
2 kg		81	81	200	17	2.07	In-Tolerance
2 kg		87	87	200	17	2.07	In-Tolerance
1 kg		51.0	51.0	100	8.8	2.07	In-Tolerance
500 g		24.5	24.5	70	6.1	2.07	In-Tolerance
200 g		17.4	17.4	40	3.5	2.07	In-Tolerance
200 g		16.4	16.4	40	3.5	2.07	In-Tolerance
100 g		1.8	1.8	20	1.8	2.07	In-Tolerance
50 g		2.44	2.44	10	0.87	2.07	In-Tolerance
20 g		0.96	0.96	4	0.35	2.07	In-Tolerance
20 g		0.62	0.62	4	0.35	2.07	In-Tolerance
10 g		0.65	0.65	2	0.18	2.06	In-Tolerance
5 g		0.17	0.17	1.5	0.13	2.07	In-Tolerance
2 g		0.456	0.456	1.1	0.096	2.07	In-Tolerance
2 g		0.346	0.346	1.1	0.096	2.07	In-Tolerance
1 g		0.082	0.082	0.9	0.079	2.07	In-Tolerance

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

 10/25/2022

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## CALIBRATION CERTIFICATE

Calibrated for: **K-Scale** Certificate number: **MP4321**  
 Calibration Date: **10/26/2022** Purchase Order Number: **0**

**Environmental conditions at time of test:**

Temperature: 20.9 °C      Humidity: 16.5 %      Pressure: 666.5 mmhg

Test method used: SOP 8 Medium Accuracy Calibrations of Mass Standards by Modified Substitution, May 2019  
 Test equipment used: Lab standards traceable to the SI, Mettler XPR5003SC, Mettler XPR226CDR, Mettler AX206, Vaisala PTU301  
 Condition of Weights: Suitable for use. No significant wear or damage

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

Nominal	SN/ID	Correction as Found mg	Correction as Left mg	NIST Class F Tolerance (mg)	Uncertainty mg	k	Condition As Left
2 kg	1	88	88	200	17	2.07	In-Tolerance
2 kg	2	89	89	200	17	2.07	In-Tolerance
2 kg	3	77	77	200	17	2.07	In-Tolerance
2 kg	4	89	89	200	17	2.07	In-Tolerance
2 kg	5	71	71	200	17	2.07	In-Tolerance
1 kg		40.0	40.0	100	8.8	2.07	In-Tolerance
500 g	1	33.5	33.5	70	6.1	2.07	In-Tolerance
500 g	2	31.5	31.5	70	6.1	2.07	In-Tolerance
500 g	3	13.5	13.5	70	6.1	2.07	In-Tolerance
500 g	4	30.5	30.5	70	6.1	2.07	In-Tolerance
500 g	5	31.5	31.5	70	6.1	2.07	In-Tolerance
200 g		12.7	12.7	40	3.5	2.07	In-Tolerance
200 g	.	10.8	10.8	40	3.5	2.07	In-Tolerance
100 g		9.7	9.7	20	1.8	2.07	In-Tolerance
50 g		4.20	4.20	10	0.87	2.07	In-Tolerance
20 g		1.22	1.22	4	0.35	2.07	In-Tolerance
20 g	.	1.83	1.83	4	0.35	2.07	In-Tolerance
10 g		0.93	0.93	2	0.18	2.06	In-Tolerance
5 g		0.91	0.91	1.5	0.13	2.07	In-Tolerance
2 g		0.486	0.486	1.1	0.096	2.07	In-Tolerance
2 g	.	-0.029	-0.029	1.1	0.096	2.07	In-Tolerance
1 g		-0.444	-0.444	0.9	0.079	2.07	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

10/25/2022  
 Ron E Peterson, Metrologist  
 Ver 20220919



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: **MP4321**  
 Calibration Date: **10/26/2022** Purchase Order Number: **0**

**Environmental conditions at time of test:**

**Temperature:** 20.9 °C **Humidity:** 16.5 % **Pressure:** 666.5 mmhg

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

**Test equipment used:** Lab standards traceable to the SI, Mettler XPR5003SC, Mettler XPR226CDR, Mettler AX206, Vaisala PTU301

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

Artifact(s): **14 piece Metric Kit** **SN 01AY**

Nominal	SN/ID	Correction as Found mg	Correction as Left mg	NIST Class F Tolerance (mg)	Uncertainty mg	<i>k</i>	Condition As Left
2 kg	1	95	95	200	17	2.07	In-Tolerance
1 kg	2	44.0	44.0	100	8.8	2.07	In-Tolerance
500 g	3	34.5	34.5	70	6.1	2.07	In-Tolerance
200 g	4	16.4	16.4	40	3.5	2.07	In-Tolerance
200 g	5	15.6	15.6	40	3.5	2.07	In-Tolerance
100 g		7.5	7.5	20	1.8	2.07	In-Tolerance
50 g	1	3.34	3.34	10	0.87	2.07	In-Tolerance
20 g	2	1.11	1.11	4	0.35	2.07	In-Tolerance
20 g	3	0.99	0.99	4	0.35	2.07	In-Tolerance
10 g	4	0.88	0.88	2	0.18	2.06	In-Tolerance
5 g	5	0.42	0.42	1.5	0.13	2.07	In-Tolerance
2 g		0.196	0.196	1.1	0.096	2.07	In-Tolerance
2 g	.	0.316	0.316	1.1	0.096	2.07	In-Tolerance
1 g		-0.544	-0.544	0.9	0.079	2.07	In-Tolerance

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