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: **MP4433**

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: **10/20/2023**
Certificate Issued: **10/23/2023**

Artifacts Submitted and Summary of Results:

Quantity	Artifact	Total Pieces	Recvd in Tol	Adjusted	Rejected	As Left In Tolerance
47	1000 lb / 500 lb weights	47	46	7	0	47
3	Weight carts	3	1	2	0	3
71	50 lb weights	71	39	50	0	71
46	25 lb weights	46	31	21	0	46
3	Loose weights	3	3	0	0	3
4	Avoirdupois weight kit	60	60	0	0	60
4	Metric kits	53	53	0	0	53

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.

Ron E Peterson, Metrologist 10/23/2023

Dwight R Johnson, Reviewer 10/23/2023

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CALIBRATION CERTIFICATE

Calibrated for: **K-Scale** Certificate Number: **MP4433**

Calibration Date: **10/25/2023**

Environmental conditions at time of test:

Temperature: 20.43 °C **Humidity:** 49.49 % **Pressure:** 663.63 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: unknown **SN:** unknown

Nominal (lb)	AS Found (lb)	As Found (g)	As Left (lb)	As Left (g)	Uncertainty (lb)	*k*	Tolerance (lb)	Condition as Left
2000	-0.48	-218.06	0.06	26.52	0.11	2.01	0.70	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.

Dwight R Johnson, Metrologist 10/25/2023 Ron E Peterson, Reviewer 10/25/2023

Ver 20220919

South Dakota Department of Public Safety
Office of Weights and Measures
Metrology Lab
Lab: 1500 N Garfield – E. Truck Bypass Phone: 605-773-3170
Office: 118 West Capitol Avenue Phone: 605-773-3697
Pierre SD 57501

Inspection Checklist for Weight Cart

Calibrated for: K-Scale **Certificate number:** **MP4433**

Calibration Date: 10/25/2023

Manufacturer:	**unknown**	**Date of Manufacture**	unknown
Model Number:	**unknown**	**ID/SN Number**	unknown

✓	Nominal Mass of Weight Cart	2000 lbs			Suitably marked: Yes/No		No
✓	Powered by:	Electric/generator	✓		Diesel		Gasoline	
	Fluid Levels:	Engine Oil					
		Hydraulic Fluid				Sealed: Yes/No	
		Battery				Sealed: Yes/No	
		Liquid Fuel				Reference Line Present: Yes/No	
✓	Fluid drain tubes extend beyond the body of the cart: Yes/No			Yes			
✓	Number of axles:		2				
✓	Number /Size of Tires		18 x 7 x 12 1/3				
✓	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)		3
✓	Adjusting cavity sealed: Yes/No		No				
✓	Service brakes functioning properly: Yes/No						
✓	Parking brakes functioning properly: Yes/No						
	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.

Dwight R. Johnson

Ron E Peterson

Dwight R Johnson, Metrologist 10/25/2023 Ron E Peterson, Reviewer 10/25/2023

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CALIBRATION CERTIFICATE

Calibrated for: **K-Scale** Certificate Number: **MP4433**

Calibration Date: **10/24/2023**

Environmental conditions at time of test:

Temperature: 21.31 °C **Humidity:** 46.11 % **Pressure:** 666.77 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	-1.39	-630.15	0.06	26.33	0.13	2.01	1.05	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 10/24/2023 Dwight R Johnson, Reviewer 10/24/2023

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Pierre SD 57501

Inspection Checklist for Weight Cart

Calibrated for: K-Scale **Certificate number:** **MP4433**

Calibration Date: 10/25/2023

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

✓	Nominal Mass of Weight Cart	3000 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	21x9x15	
✓	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) 25
✓	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.

✓

Ron E Peterson, Metrologist 10/24/2023 Dwight R Johnson, Reviewer 10/24/2023

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CALIBRATION CERTIFICATE

Calibrated for: **K-Scale** Certificate Number: **MP4433**

Calibration Date: **10/25/2023**

Environmental conditions at time of test:

Temperature: 21.01 °C **Humidity:** 44.54 % **Pressure:** 664.15 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	0.20	90.45	0.20	90.45	0.13	2.01	1.40	In-Tolerance

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.

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Inspection Checklist for Weight Cart

Calibrated for: K-Scale **Certificate number:** **MP4433**

Calibration Date: 10/25/2023

Manufacturer:	**B-Tek Scales**	**Date of Manufacture**	Unk
Model Number:	**BSWTC-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		21x9x15			
✓	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)		25
✓	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:** **MP4433**

Calibration Date: 10/23/2023 Purchase Order Number: **0**

Environmental conditions at time of test:

Temperature: 21.1 °C **Humidity:** 46.87 % **Pressure:** 662.37 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): **5 - 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	9	-0.01	-2.5	-0.01	-2.5	45	4.7	2.0	In-Tolerance
1000 lb	15	-0.05	-20.8	-0.05	-20.8	45	4.7	2.0	In-Tolerance
1000 lb	28	-0.03	-15.4	-0.03	-15.4	45	4.7	2.0	In-Tolerance
1000 lb	X	-0.05	-22.7	0.00	0.1	45	4.7	2.0	Adjusted
1000 lb	Z	0.02	9.0	0.02	9.0	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.

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 10/23/2023 Dwight R Johnson, Reviewer 10/23/2023

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CALIBRATION CERTIFICATE

Calibrated for: **K-Scale** **Certificate number:** **MP4433**

Calibration Date: 10/24/2023 Purchase Order Number: **0**

Environmental conditions at time of test:

Temperature: 21.1 °C **Humidity:** 44.8 % **Pressure:** 666.5 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): **19 - 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	I	0.09	39.5	0.00	0.0	45	4.7	2.0	Adjusted
1000 lb	1	-0.02	-11.2	-0.02	-11.2	45	4.7	2.0	In-Tolerance
1000 lb	1	0.05	22.1	0.05	22.1	45	4.7	2.0	In-Tolerance
1000 lb	2	-0.02	-8.6	-0.02	-8.6	45	4.7	2.0	In-Tolerance
1000 lb	4	-0.02	-8.7	-0.02	-8.7	45	4.7	2.0	In-Tolerance
1000 lb	7	-0.03	-14.5	-0.03	-14.5	45	4.7	2.0	In-Tolerance
1000 lb	8	0.07	31.3	0.00	0.0	45	4.7	2.0	Adjusted
1000 lb	11	0.04	20.3	0.04	20.3	45	4.7	2.0	In-Tolerance
1000 lb	13	-0.04	-17.4	-0.04	-17.4	45	4.7	2.0	In-Tolerance
1000 lb	14	0.03	12.8	0.03	12.8	45	4.7	2.0	In-Tolerance
1000 lb	24	0.05	21.0	0.05	21.0	45	4.7	2.0	In-Tolerance
1000 lb	25	-0.04	-17.9	-0.04	-17.9	45	4.7	2.0	In-Tolerance
1000 lb	CC	0.04	18.6	0.04	18.6	45	4.7	2.0	In-Tolerance
1000 lb	GG	0.02	7.3	0.02	7.3	45	4.7	2.0	In-Tolerance
1000 lb	J	0.08	34.4	0.00	-0.1	45	4.7	2.0	Adjusted
1000 lb	K	-0.01	-6.8	-0.01	-6.8	45	4.7	2.0	In-Tolerance
1000 lb	RR	-0.01	-2.6	-0.01	-2.6	45	4.7	2.0	In-Tolerance
1000 lb	RR	-0.02	-10.6	-0.02	-10.6	45	4.7	2.0	In-Tolerance
1000 lb	unknown	-0.01	-6.8	-0.015	-6.8	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 10/24/2023 Dwight R Johnson, Reviewer 10/24/2023

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CALIBRATION CERTIFICATE

Calibrated for: **K-Scale** **Certificate number:** **MP4433**

Calibration Date: 10/24/2023 Purchase Order Number: **0**

Environmental conditions at time of test:

Temperature: 21.1 °C **Humidity:** 44.8 % **Pressure:** 666.5 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): **19 - 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	6.5	0.01	6.5	45	4.7	2.0	In-Tolerance
1000 lb	5	-0.02	-7.6	-0.02	-7.6	45	4.7	2.0	In-Tolerance
1000 lb	10	-0.01	-6.0	-0.01	-6.0	45	4.7	2.0	In-Tolerance
1000 lb	12	0.03	13.6	0.03	13.6	45	4.7	2.0	In-Tolerance
1000 lb	17	-0.03	-14.5	-0.03	-14.5	45	4.7	2.0	In-Tolerance
1000 lb	19	0.03	13.9	0.03	13.9	45	4.7	2.0	In-Tolerance
1000 lb	20	-0.01	-3.2	-0.01	-3.2	45	4.7	2.0	In-Tolerance
1000 lb	21	0.01	3.1	0.01	3.1	45	4.7	2.0	In-Tolerance
1000 lb	26	0.02	9.6	0.02	9.6	45	4.7	2.0	In-Tolerance
1000 lb	41	0.03	15.5	0.03	15.5	45	4.7	2.0	In-Tolerance
1000 lb	122	-0.05	-21.0	-0.05	-21.0	45	4.7	2.0	In-Tolerance
1000 lb	D	0.05	22.7	0.05	22.7	45	4.7	2.0	In-Tolerance
1000 lb	E	0.07	31.7	0.00	0.0	45	4.7	2.0	Adjusted
1000 lb	G	0.01	4.4	0.01	4.4	45	4.7	2.0	In-Tolerance
1000 lb	J	0.01	6.5	0.01	6.5	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	0.01	5.6	0.01	5.6	45	4.7	2.0	In-Tolerance
1000 lb	N	0.02	8.9	0.02	8.9	45	4.7	2.0	In-Tolerance
1000 lb	P	0.12	56.1	0.0	0.0	45	4.7	2.0	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 10/24/2023 Dwight R Johnson, Reviewer 10/24/2023

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CALIBRATION CERTIFICATE

Calibrated for: **K-Scale** **Certificate number:** **MP4433**

Calibration Date: 10/24/2023 Purchase Order Number: **0**

Environmental conditions at time of test:

Temperature: 21.37 °C **Humidity:** 44.05 % **Pressure:** 666.04 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): **4 - 500 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
500 lb	A	0.02	8.4	0.02	8.4	23	2.6	2.0	In-Tolerance
500 lb	B	-0.01	-3.8	-0.01	-3.8	23	2.6	2.0	In-Tolerance
500 lb	C	0.00	-0.2	0.00	-0.2	23	2.6	2.0	In-Tolerance
500 lb	D	0.03	15.8	0.00	-0.1	23	2.6	2.0	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 10/24/2023 Dwight R Johnson, Reviewer 10/24/2023

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:** **MP4433**

Calibration Date: 10/23/2023 Purchase Order Number:

Environmental conditions at time of test:

Temperature: 21.78 °C **Humidity:** 45.8 % **Pressure:** 663.6 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, Mettler XPR5003SC, Mettler XPR226CDR, Mettler AX206, Vaisala PTU301

Condition of Weights: Cleaned and painted

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	-883	-883	2300	200	2.04	In-Tolerance
50 lb	2	-2188	17	2300	200	2.04	Adjusted
50 lb	3	-1378	7	2300	200	2.04	Adjusted
50 lb	4	78	-773	2300	200	2.04	Adjusted
50 lb	5	-4863	42	2300	200	2.04	Adjusted
50 lb	6	-1893	2	2300	200	2.04	Adjusted
50 lb	7	-6288	2	2300	200	2.04	Adjusted
50 lb	8	-4298	22	2300	200	2.04	Adjusted
50 lb	10	-2618	2	2300	200	2.04	Adjusted
50 lb	11	-578	-578	2300	200	2.04	In-Tolerance
50 lb	11	-2903	-3	2300	200	2.04	Adjusted
50 lb	13	-1688	2	2300	200	2.04	Adjusted
50 lb	14	-1258	7	2300	200	2.04	Adjusted
50 lb	15	-2228	-23	2300	200	2.04	Adjusted
50 lb	17	-2633	17	2300	200	2.04	Adjusted
50 lb	18	-2458	2	2300	200	2.04	Adjusted
50 lb	19	-1043	-1043	2300	200	2.04	In-Tolerance
50 lb	20	-4218	17	2300	200	2.04	Adjusted
50 lb	22	-1678	52	2300	200	2.04	Adjusted
50 lb	24	-2463	2	2300	200	2.04	Adjusted
50 lb	25	-1903	22	2300	200	2.04	Adjusted
50 lb	26	-3403	2	2300	200	2.04	Adjusted
50 lb	27	-3543	7	2300	200	2.04	Adjusted
50 lb	28	-3198	-3	2300	200	2.04	Adjusted
50 lb	31	-2553	-8	2300	200	2.04	Adjusted
50 lb	45	-253	-253	2300	200	2.04	In-Tolerance
50 lb	52	-1143	-1143	2300	200	2.04	In-Tolerance
50 lb	333	-1663	12	2300	200	2.04	Adjusted

* Adjusted artif

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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 10/23/2023 Dwight R Johnson, Reviewer 10/23/2023

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CALIBRATION CERTIFICATE

Calibrated for: **K-Scale** **Certificate number:** **MP4433**

Calibration Date: 10/23/2023 Purchase Order Number:

Environmental conditions at time of test:

Temperature: 21.78 °C **Humidity:** 45.8 % **Pressure:** 663.6 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, Mettler XPR5003SC, Mettler XPR226CDR, Mettler AX206, Vaisala PTU301

Condition of Weights: Cleaned and painted

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	21	-1673	7	2300	200	2.04	Adjusted
50 lb	32	-2788	-3	2300	200	2.04	Adjusted
50 lb	33	-1068	-1068	2300	200	2.04	In-Tolerance
50 lb	34	-278	-278	2300	200	2.04	In-Tolerance
50 lb	36	-6458	-8	2300	200	2.04	Adjusted
50 lb	39	-2998	37	2300	200	2.04	Adjusted
50 lb	40	-1243	42	2300	200	2.04	Adjusted
50 lb	41	-2218	2	2300	200	2.04	Adjusted
50 lb	47	-1728	-13	2300	200	2.04	Adjusted
50 lb	48	-3403	37	2300	200	2.04	Adjusted
50 lb	50	-2088	-8	2300	200	2.04	Adjusted
50 lb	51	-5213	7	2300	200	2.04	Adjusted
50 lb	53	-1963	12	2300	200	2.04	Adjusted
50 lb	90	-4898	2	2300	200	2.04	Adjusted
50 lb	96	-1898	-3	2300	200	2.04	Adjusted
50 lb	97	-138	-138	2300	200	2.04	In-Tolerance
50 lb	98	-1048	-1048	2300	200	2.04	In-Tolerance
50 lb	321	-4278	2	2300	200	2.04	Adjusted
50 lb	KS-C44	-2063	2	2300	200	2.04	Adjusted
50 lb	R	-1208	-13	2300	200	2.04	Adjusted
50 lb	unk	-2168	-13	2300	200	2.04	Adjusted
50 lb	X	-2073	-8	2300	200	2.04	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 10/23/2023 Dwight R Johnson, Reviewer 10/23/2023

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CALIBRATION CERTIFICATE

Calibrated for: **K-Scale** **Certificate number:** **MP4433**

Calibration Date: 10/23/2023 Purchase Order Number:

Environmental conditions at time of test:

Temperature: 20.57 °C **Humidity:** 48.335 % **Pressure:** 663.77 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, Mettler XPR5003SC, Mettler XPR226CDR, Mettler AX206, Vaisala PTU301

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

Artifact(s): **20 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	SD21	-1428	-3	2300	200	2.04	Adjusted
50 lb	SD25	-963	-963	2300	200	2.04	In-Tolerance
50 lb	SD32	-8	-8	2300	200	2.04	In-Tolerance
50 lb	SD33	492	492	2300	200	2.04	In-Tolerance
50 lb	SD39	4237	1002	2300	200	2.04	Adjusted
50 lb	SD42	-363	-363	2300	200	2.04	In-Tolerance
50 lb	SD45	207	207	2300	200	2.04	In-Tolerance
50 lb	SD46	-2473	7	2300	200	2.04	Adjusted
50 lb	SD47	-603	-603	2300	200	2.04	In-Tolerance
50 lb	SD48	-778	-778	2300	200	2.04	In-Tolerance
50 lb	SD49	2922	-3	2300	200	2.04	Adjusted
50 lb	SD50	-2218	-3	2300	200	2.04	Adjusted
50 lb	SD51	-503	-503	2300	200	2.04	In-Tolerance
50 lb	SD55	-93	-93	2300	200	2.04	In-Tolerance
50 lb	SD59	-118	-118	2300	200	2.04	In-Tolerance
50 lb	SD68	517	517	2300	200	2.04	In-Tolerance
50 lb	27	5452	-8	2300	200	2.04	Adjusted
50 lb	8	1892	-3	2300	200	2.04	Adjusted
50 lb	46	482	-13	2300	200	2.04	Adjusted
50 lb	91	3442	-18	2300	200	2.04	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

Dwight R. Johnson Ron E Peterson

Dwight R Johnson, Metrologist 10/23/2023 Ron E Peterson, Reviewer 10/23/2023

South Dakota Department of Public Safety
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CALIBRATION CERTIFICATE

Calibrated for: **K-Scale** **Certificate number:** **MP4433**

Calibration Date: 10/23/2023 Purchase Order Number:

Environmental conditions at time of test:

Temperature: 21.53 °C **Humidity:** 44.65 % **Pressure:** 664.15 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, Mettler XPR5003SC, Mettler XPR226CDR, Mettler AX206, Vaisala PTU301

Condition of Weights: Cleaned and painted

Artifact(s): **4 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 kg	Y	-285	-285	2000	200	2.04	In-Tolerance
5 kg	1E	-136	-136	500	43	2.05	In-Tolerance
10 lb	58	-167	-167	450	39	2.05	In-Tolerance
20 lb	57	334	334	910	130	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 10/23/2023 Dwight R Johnson, Reviewer 10/23/2023

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CALIBRATION CERTIFICATE

Calibrated for: **K-Scale** **Certificate number:** **MP4433**

Calibration Date: 10/23/2023 Purchase Order Number:

Environmental conditions at time of test:

Temperature: 21.53 °C **Humidity:** 44.65 % **Pressure:** 664.15 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, Mettler XPR5003SC, Mettler XPR226CDR, Mettler AX206, Vaisala PTU301

Condition of Weights: Cleaned and painted

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	1	-229	-229	1100	130	2.04	In-Tolerance
25 lb	2	-619	16	1100	130	2.04	Adjusted
25 lb	3	-1059	-4	1100	130	2.04	Adjusted
25 lb	1K	181	181	1100	130	2.04	In-Tolerance
25 lb	1PH11	-474	-474	1100	130	2.04	In-Tolerance
25 lb	1PHE	496	496	1100	130	2.04	In-Tolerance
25 lb	1PJ1	-1274	66	1100	130	2.04	Adjusted
25 lb	1PJ9	-629	-9	1100	130	2.04	Adjusted
25 lb	1PJA	-499	-499	1100	130	2.04	In-Tolerance
25 lb	1PJB	-2079	21	1100	130	2.04	Adjusted
25 lb	1PJF	-1329	1	1100	130	2.04	Adjusted
25 lb	1PJE	-209	-209	1100	130	2.04	In-Tolerance
25 lb	1PJH	-474	-474	1100	130	2.04	In-Tolerance
25 lb	1PJJ	-1324	36	1100	130	2.04	Adjusted
25 lb	1PJL	-574	-574	1100	130	2.04	In-Tolerance
25 lb	1PJM	-504	-504	1100	130	2.04	In-Tolerance
25 lb	1PJN	-879	11	1100	130	2.04	Adjusted
25 lb	1PJO	-549	-549	1100	130	2.04	In-Tolerance
25 lb	1PJP	-479	-479	1100	130	2.04	In-Tolerance
25 lb	1PJX	-504	-504	1100	130	2.04	In-Tolerance
25 lb	1PJZ	-549	-549	1100	130	2.04	In-Tolerance
25 lb	1PKH	-1419	6	1100	130	2.04	Adjusted
25 lb	1PKI	-1304	-4	1100	130	2.04	Adjusted
25 lb	1PKL	-479	-479	1100	130	2.04	In-Tolerance
25 lb	5H1W	-74	-74	1100	130	2.04	In-Tolerance
25 lb	5HJ2	56	56	1100	130	2.04	In-Tolerance
25 lb	KSD2	-1304	6	1100	130	2.04	Adjusted
25 lb	X	-319	-319	1100	130	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

Dwight R Johnson, Metrologist 10/23/2023 Ron E Peterson, Reviewer 10/23/2023

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Metrology Lab
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CALIBRATION CERTIFICATE

Calibrated for: **K-Scale** **Certificate number:** **MP4433**

Calibration Date: 10/23/2023 Purchase Order Number:

Environmental conditions at time of test:

Temperature: 21.53 °C **Humidity:** 44.65 % **Pressure:** 664.15 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, Mettler XPR5003SC, Mettler XPR226CDR, Mettler AX206, Vaisala PTU301

Condition of Weights: Cleaned and painted

Artifact(s): **17 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	50224	126	126	1100	130	2.04	In-Tolerance
25 lb	1PJS	-3334	36	1100	130	2.04	Adjusted
25 lb	1PJT	-364	-364	1100	130	2.04	In-Tolerance
25 lb	1PJW	-939	-14	1100	130	2.04	Adjusted
25 lb	1PK0	-459	-459	1100	130	2.04	In-Tolerance
25 lb	1PK2	-1584	36	1100	130	2.04	Adjusted
25 lb	1PK3	-1084	-64	1100	130	2.04	Adjusted
25 lb	1PK4	-1909	-89	1100	130	2.04	Adjusted
25 lb	1PK5	-684	6	1100	130	2.04	Adjusted
25 lb	1PK6	-369	-369	1100	130	2.04	In-Tolerance
25 lb	1PK7	-1164	6	1100	130	2.04	Adjusted
25 lb	1PK8	-279	-279	1100	130	2.04	In-Tolerance
25 lb	1PK9	-1464	6	1100	130	2.04	Adjusted
25 lb	1PKG	-654	41	1100	130	2.04	Adjusted
25 lb	1PKJ	-889	-119	1100	130	2.04	Adjusted
25 lb	1PKM	-449	-449	1100	130	2.04	In-Tolerance
25 lb	1PKO	161	161	1100	130	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

Dwight R Johnson, Metrologist 10/23/2023 Ron E Peterson, Reviewer 10/23/2023

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CALIBRATION CERTIFICATE

Calibrated for: **K-Scale** **Certificate number:** **MP4433**

Calibration Date: 10/24/2023 Purchase Order Number:

Environmental conditions at time of test:

Temperature: 20.02 °C **Humidity:** 47.43 % **Pressure:** 666.29 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, 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		Correction as Found	Correction as Left	NIST Class F	Uncertainty		Condition
	SN/ID	mg	mg	Tolerance (mg)	mg	*k*	As Left
2 kg		92	92	200	17	2.05	In-Tolerance
1 kg		42.0	42.0	100	8.7	2.05	In-Tolerance
500 g		34.5	34.5	70	6.1	2.05	In-Tolerance
200 g		16.5	16.5	40	3.4	2.05	In-Tolerance
200 g	.	15.4	15.4	40	3.4	2.05	In-Tolerance
100 g		9.6	9.6	20	1.7	2.05	In-Tolerance
50 g		4.06	4.06	10	0.86	2.05	In-Tolerance
20 g		1.12	1.12	4	0.35	2.05	In-Tolerance
20 g	.	1.81	1.81	4	0.35	2.05	In-Tolerance
10 g		0.95	0.95	2	0.17	2.05	In-Tolerance
5 g		0.86	0.86	1.5	0.13	2.05	In-Tolerance
2 g		0.491	0.491	1.1	0.095	2.05	In-Tolerance
2 g	.	-0.029	-0.029	1.1	0.095	2.05	In-Tolerance
1 g		-0.424	-0.424	0.9	0.078	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

Dwight R. Johnson Ron E

Dwight R Johnson, Metrologist 10/24/2023 Ron E Peterson, Reviewer 10/24/2023

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CALIBRATION CERTIFICATE

Calibrated for: **K-Scale** **Certificate number:** **MP4433**

Calibration Date: 10/24/2023 Purchase Order Number:

Environmental conditions at time of test:

Temperature: 20.02 °C **Humidity:** 47.43 % **Pressure:** 666.29 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, 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 080600B**

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	88	88	200	17	2.05	In-Tolerance
2 kg	2	90	90	200	17	2.05	In-Tolerance
2 kg	3	81	81	200	17	2.05	In-Tolerance
2 kg	4	91	91	200	17	2.05	In-Tolerance
2 kg	5	74	74	200	17	2.05	In-Tolerance
1 kg		41.0	41.0	100	8.7	2.05	In-Tolerance
500 g	1	33.5	33.5	70	6.1	2.05	In-Tolerance
500 g	2	31.5	31.5	70	6.1	2.05	In-Tolerance
500 g	3	13.5	13.5	70	6.1	2.05	In-Tolerance
500 g	4	29.5	29.5	70	6.1	2.05	In-Tolerance
500 g	5	31.5	31.5	70	6.1	2.05	In-Tolerance
200 g		12.8	12.8	40	3.4	2.05	In-Tolerance
200 g	.	10.7	10.7	40	3.4	2.05	In-Tolerance
100 g		7.5	7.5	20	1.7	2.05	In-Tolerance
50 g		3.31	3.31	10	0.86	2.05	In-Tolerance
20 g		1.08	1.08	4	0.35	2.05	In-Tolerance
20 g	.	0.97	0.97	4	0.35	2.05	In-Tolerance
10 g		0.85	0.85	2	0.17	2.05	In-Tolerance
5 g		0.40	0.40	1.5	0.13	2.05	In-Tolerance
2 g		0.195	0.195	1.1	0.095	2.05	In-Tolerance
2 g	.	0.326	0.326	1.1	0.095	2.05	In-Tolerance
1 g		-0.519	-0.519	0.9	0.078	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 10/24/2023 Dwight R Johnson, Reviewer 10/24/2023

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CALIBRATION CERTIFICATE

Calibrated for: **K-Scale** **Certificate number:** **MP4433**

Calibration Date: 10/24/2023 Purchase Order Number:

Environmental conditions at time of test:

Temperature: 21.14 °C **Humidity:** 46.93 % **Pressure:** 666.2 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, 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		Correction as Found	Correction as Left	NIST Class F	Uncertainty		Condition
	SN/ID	mg	mg	Tolerance (mg)	mg	*k*	As Left
10 lb	12	35	35	450	39	2.05	In-Tolerance
10 lb	KS	-111	-111	450	39	2.05	In-Tolerance
5 lb		24	24	230	20	2.05	In-Tolerance
1 lb	4	-17.6	-17.6	70	6.1	2.05	In-Tolerance
1 lb	KS3	4.5	4.5	70	6.1	2.05	In-Tolerance
1 lb	KS1	-6.6	-6.6	70	6.1	2.05	In-Tolerance
1 lb	5	15.5	15.5	70	6.1	2.05	In-Tolerance
1 lb	8	2.5	2.5	70	6.1	2.05	In-Tolerance
4 oz	KS1	7.7	7.7	23	2.0	2.04	In-Tolerance
4 oz	KS2	10.2	10.2	23	2.0	2.04	In-Tolerance
4 oz	KS3	0.2	0.2	23	2.0	2.04	In-Tolerance
1 oz	2	2.20	2.20	5.4	0.48	2.03	In-Tolerance
1 oz	3	1.84	1.84	5.4	0.48	2.03	In-Tolerance
1/2 oz		1.25	1.25	2.8	0.25	2.05	In-Tolerance
1/2 oz	.	0.18	0.18	2.8	0.25	2.05	In-Tolerance
1/4 oz		0.26	0.26	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

Dwight R Johnson, Metrologist 10/24/2023 Ron E Peterson, Reviewer 10/24/2023

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:** **MP4433**

Calibration Date: 10/24/2023 Purchase Order Number:

Environmental conditions at time of test:

Temperature: 21.14 °C **Humidity:** 46.93 % **Pressure:** 666.2 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, 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		Correction as Found	Correction as Left	NIST Class F	Uncertainty		Condition
	SN/ID	mg	mg	Tolerance (mg)	mg	*k*	As Left
5 lb		28	28	230	20	2.05	In-Tolerance
2 lb	5	11.4	11.4	91	7.9	2.05	In-Tolerance
2 lb	6	28.4	28.4	91	7.9	2.05	In-Tolerance
1 lb	4	10.5	10.5	70	6.1	2.05	In-Tolerance
0.5 lb	3	3.2	3.2	45	4.1	2.05	In-Tolerance
0.2 lb	1	8.6	8.6	18	1.6	2.05	In-Tolerance
0.2 lb	2	8.3	8.3	18	1.6	2.05	In-Tolerance
0.1 lb		7.35	7.35	9.1	0.79	2.05	In-Tolerance
0.05 lb		2.27	2.27	4.5	0.39	2.05	In-Tolerance
0.02 lb		1.38	1.38	1.8	0.16	2.05	In-Tolerance
0.02 lb	.	0.83	0.83	1.8	0.16	2.05	In-Tolerance
0.01 lb		0.53	0.53	1.5	0.13	2.05	In-Tolerance
0.005 lb		0.84	0.84	1.2	0.11	2.07	In-Tolerance
0.002 lb		0.565	0.565	0.87	0.076	2.06	In-Tolerance
0.002 lb	.	0.705	0.705	0.87	0.076	2.06	In-Tolerance
0.001 lb		0.109	0.109	0.7	0.062	2.06	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

Dwight R Johnson, Metrologist 10/24/2023 Ron E Peterson, Reviewer 10/24/2023

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CALIBRATION CERTIFICATE

Calibrated for: **K-Scale** **Certificate number:** **MP4433**

Calibration Date: 10/25/2023 Purchase Order Number:

Environmental conditions at time of test:

Temperature: 20.98 °C **Humidity:** 46.89 % **Pressure:** 663.83 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, Mettler XPR5003SC, Mettler XPR226CDR, Mettler AX206, Vaisala PTU301

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

Artifact(s): **10 Avoirdupois Weight(s)** **SN SD180711**

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	11.2	11.2	45	4.1	2.05	In-Tolerance
8 oz	2	14.2	14.2	45	4.1	2.05	In-Tolerance
8 oz	3	19.2	19.2	45	4.1	2.05	In-Tolerance
8 oz	4	23.2	23.2	45	4.1	2.05	In-Tolerance
8 oz	5	17.2	17.2	45	4.1	2.05	In-Tolerance
8 oz	6	23.2	23.2	45	4.1	2.05	In-Tolerance
8 oz	7	21.2	21.2	45	4.1	2.05	In-Tolerance
8 oz	8	19.2	19.2	45	4.1	2.05	In-Tolerance
8 oz	9	14.2	14.2	45	4.1	2.05	In-Tolerance
8 oz	10	12.2	12.2	45	4.1	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

Dwight R Johnson, Metrologist 10/25/2023 Ron E Peterson, Reviewer 10/25/2023

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CALIBRATION CERTIFICATE

Calibrated for: **K-Scale** **Certificate number:** **MP4433**

Calibration Date: 10/23/2023 Purchase Order Number:

Environmental conditions at time of test:

Temperature: 21.12 °C **Humidity:** 45.97 % **Pressure:** 664.53 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, 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		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	2.05	In-Tolerance
2 kg		82	82	200	17	2.05	In-Tolerance
2 kg	.	89	89	200	17	2.05	In-Tolerance
1 kg		51.0	51.0	100	8.7	2.05	In-Tolerance
500 g		24.5	24.5	70	6.1	2.05	In-Tolerance
200 g		17.4	17.4	40	3.4	2.05	In-Tolerance
200 g	.	16.4	16.4	40	3.4	2.05	In-Tolerance
100 g		1.8	1.8	20	1.7	2.05	In-Tolerance
50 g		2.31	2.31	10	0.86	2.05	In-Tolerance
20 g		0.93	0.93	4	0.35	2.05	In-Tolerance
20 g	.	0.59	0.59	4	0.35	2.05	In-Tolerance
10 g		0.63	0.63	2	0.17	2.05	In-Tolerance
5 g		0.16	0.16	1.5	0.13	2.05	In-Tolerance
2 g		0.451	0.451	1.1	0.095	2.05	In-Tolerance
2 g	.	0.336	0.336	1.1	0.095	2.05	In-Tolerance
1 g		0.102	0.102	0.9	0.078	2.05	In-Tolerance

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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:** **MP4433**

Calibration Date: 10/23/2023 Purchase Order Number:

Environmental conditions at time of test:

Temperature: 21.09 °C **Humidity:** 45..74 % **Pressure:** 664.51 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, 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		Correction as Found	Correction as Left	NIST Class F	Uncertainty		Condition
	SN/ID	mg	mg	Tolerance (mg)	mg	*k*	As Left
10 lb		121	121	450	39	2.05	In-Tolerance
10 lb	.	128	128	450	39	2.05	In-Tolerance
5 lb		81	81	230	20	2.05	In-Tolerance
2 lb		32.4	32.4	91	7.9	2.05	In-Tolerance
2 lb	.	27.4	27.4	91	7.9	2.05	In-Tolerance
1 lb		8.5	8.5	70	6.1	2.05	In-Tolerance
0.5 lb		10.2	10.2	45	4.1	2.05	In-Tolerance
0.2 lb		0.5	0.5	18	1.6	2.05	In-Tolerance
0.2 lb	.	3.2	3.2	18	1.6	2.05	In-Tolerance
0.1 lb		3.22	3.22	9.1	0.79	2.05	In-Tolerance
0.05 lb		1.39	1.39	4.5	0.39	2.05	In-Tolerance
0.02 lb		0.47	0.47	1.8	0.16	2.05	In-Tolerance
0.02 lb	.	0.45	0.45	1.8	0.16	2.05	In-Tolerance
0.01 lb		0.39	0.39	1.5	0.13	2.05	In-Tolerance
0.005 lb		0.76	0.76	1.2	0.11	2.07	In-Tolerance
0.002 lb		0.250	0.250	0.87	0.076	2.06	In-Tolerance
0.002 lb	.	0.300	0.300	0.87	0.076	2.06	In-Tolerance
0.001 lb		0.389	0.389	0.7	0.062	2.06	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:** **MP4433**

Calibration Date: 10/23/2023 Purchase Order Number:

Environmental conditions at time of test:

Temperature: 21.12 °C **Humidity:** 45.97 % **Pressure:** 664.53 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, Mettler XPR5003SC, Mettler XPR226CDR, Mettler AX206, Vaisala PTU301

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

Artifact(s): **1 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
300 g		-4.6	-4.6	60	6.1	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

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