

Office of Weights and Measures

Metrology Laboratory

Office: 118 West Capitol Avenue, Pierre, SD 57501

Lab: 1500 N Garfield – E. HWY 14/83 Truck Bypass, Pierre, SD 57501

Lab: 605-773-3170, 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

Certificate number: **MP3995 Rev 1**

Physical Address:

1701 W Madison
Sioux Falls, SD 57104

Billing Address:

1701 W Madison
Sioux Falls, SD 57104

Contact: **Kevin Baumgartner**

Received Date: **10/26/2020**

Phone: **605-334-8003**

Certificate Issued: **10/29/2020**

Artifacts Submitted and Summary of Results:

Quantity	Artifact	Total Pieces	Recvd in Tol	Adjusted	Rejected	As Left In Tolerance
1	4000 lb Weight Cart(s)	1	1	1	0	1
39	1000 lb weights	39	37	2	0	39
2	500 lb weights	2	2	0	0	2
72	50 lb weights	72	65	13	0	72
45	25 lb weights	45	42	10	0	45
9	Loose weights	9	9	0	0	9
7	Class F kits	112	112	0	0	112

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.) and 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 33 % 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.


 _____ 10/29/2020
 Ron Peterson, Metrologist



South Dakota Department of Public Safety
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 Pierre SD 57501



CALIBRATION CERTIFICATE

Calibrated for: **K Scale** Certificate Number: **MP3995 Rev 1**
 Calibration Date: **10/27/2020**

Environmental conditions at time of test:

Temperature: 20 °C **Humidity:** 23.4 % **Pressure:** 712.5 mmhg
 SOP 33, Calibrations of Weight Carts, May 2019. Exception: Humidity in the laboratory was not within

Test method used: parameters.

Test equipment used: Recently calibrated weights and a Mettler-Toledo SLS510 load cell with IND570.

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)	k	Tolerance (lb)	Condition as Left
4000	0.85	385.86	0.07	30.08	0.16	2.03	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 possible 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.

 10/29/2020
 Ron Peterson, Metrologist



Inspection Checklist for Weight Cart


Calibrated for: K Scale Certificate number: MP3995 Rev 1
 Calibration Date: 10/29/2020

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

<input checked="" type="checkbox"/>	Nominal Mass of Weight Cart	4000 lbs	Suitably marked: Yes/No	Yes
<input checked="" type="checkbox"/>	Powered by:	Electric/generator	Diesel	Gasoline <input checked="" type="checkbox"/>
	Fluid Levels:	Engine Oil		
		Hydraulic Fluid		Sealed: Yes/No No
		Battery		Sealed: Yes/No Yes
		Liquid Fuel		Reference Line Present: Yes/No Yes
<input checked="" type="checkbox"/>	Fluid drain tubes extend beyond the body of the cart: Yes/No		Yes	
<input checked="" type="checkbox"/>	Number of axles:	2		
<input checked="" type="checkbox"/>	Number /Size of Tires	4-21x7x45		
<input checked="" type="checkbox"/>	Sealed wheel bearings: Yes/No	Yes		
<input checked="" type="checkbox"/>	Drain holes present in locations where water may accumulate: Yes/No		Yes	
<input checked="" type="checkbox"/>	Weight restraint railing permanently fixed and solid: Yes/No		Yes	
<input checked="" type="checkbox"/>	Adjusting cavity accessible: Yes/No	Yes	Approximate capacity:(lbs)	100 lbs
<input checked="" type="checkbox"/>	Adjusting cavity sealed: Yes/No	Yes		
<input checked="" type="checkbox"/>	Service brakes functioning properly: Yes/No		Yes	
<input checked="" type="checkbox"/>	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: **MP3995 Rev 1**
 Calibration Date: **10/27/2020** Purchase Order Number: **0**
 Environmental conditions at time of test:
 Temperature: 21.5 °C **Humidity: 45 %** **Pressure: 715mmhg**
Test method used: SOP 8 Medium Accuracy Calibrations of Mass Standards by Modified Substitution, May 2019
Test equipment used: Lab standards traceable to NIST and MettlerAX205, Mettler PR503, Mettler AX206, Vaisala PTU301
Condition of Weights: Cleaned and painted

Artifact(s): 20 - 1000 lb weights

Nominal	SN/ID	Correction as Found		Correction as Left		NIST Class F Tolerance (g)	Uncertainty		Condition As Left
		lb	g	lb	g		g	k	
1000 lb	18J	0.11	49.2	0.00	0.7	45	4.9	2.03	Adjusted
1000 lb	1	-0.03	-14.7	-0.03	-14.7	45	4.9	2.03	In-Tolerance
1000 lb	2	0.01	5.4	0.01	5.4	45	4.9	2.03	In-Tolerance
1000 lb	4	-0.03	-12.7	-0.03	-12.7	45	4.9	2.03	In-Tolerance
1000 lb	5	0.00	-1.8	0.00	-1.8	45	4.9	2.03	In-Tolerance
1000 lb	6	0.00	-0.8	0.00	-0.8	45	4.9	2.03	In-Tolerance
1000 lb	7	-0.01	-6.7	-0.01	-6.7	45	4.9	2.03	In-Tolerance
1000 lb	8	-0.02	-10.7	-0.02	-10.7	45	4.9	2.03	In-Tolerance
1000 lb	9	0.00	-1.2	0.00	-1.2	45	4.9	2.03	In-Tolerance
1000 lb	11	-0.03	-14.5	-0.03	-14.5	45	4.9	2.03	In-Tolerance
1000 lb	12	0.02	9.8	0.02	9.8	45	4.9	2.03	In-Tolerance
1000 lb	16	0.01	3.4	0.01	3.4	45	4.9	2.03	In-Tolerance
1000 lb	17	-0.03	-13.3	-0.03	-13.3	45	4.9	2.03	In-Tolerance
1000 lb	23	0.05	23.8	0.05	23.8	45	4.9	2.03	In-Tolerance
1000 lb	24	0.02	10.1	0.02	10.1	45	4.9	2.03	In-Tolerance
1000 lb	28	0.11	52.0	0.00	0.7	45	4.9	2.03	Adjusted
1000 lb	A	0.07	29.6	0.07	29.6	45	4.9	2.03	In-Tolerance
1000 lb	R	0.01	5.0	0.01	5.0	45	4.9	2.03	In-Tolerance
1000 lb	RR	-0.01	-2.4	-0.01	-2.4	45	4.9	2.03	In-Tolerance
1000 lb	X	-0.02	-7.6	-0.02	-7.6	45	4.9	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

10/29/2020

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 Pierre SD 57501



CALIBRATION CERTIFICATE


Calibrated for: K Scale **Certificate number:** MP3995 Rev 1
Calibration Date: 10/28/2020 **Purchase Order Number:** 0
Environmental conditions at time of test:
 Temperature: 22.1 °C Humidity: 44.5 % Pressure: 717mmhg
Test method used: SOP 8 Medium Accuracy Calibrations of Mass Standards by Modified Substitution, May 2019
Test equipment used: Lab standards traceable to NIST and Mettler AX205, Mettler PR503, Mettler AX206, Vaisala PTU301
Condition of Weights: Cleaned and painted

Artifact(s): 19 - 1000 lb weights

Nominal	SN/ID	Correction as Found		Correction as Left		NIST Class F Tolerance (g)	Uncertainty		Condition As Left
		lb	g	lb	g		g	k	
1000 lb	3	0.05	22.3	0.05	22.3	45	4.9	2.03	In-Tolerance
1000 lb	6	0.02	11.3	0.02	11.3	45	4.9	2.03	In-Tolerance
1000 lb	10	0.00	-1.3	0.00	-1.3	45	4.9	2.03	In-Tolerance
1000 lb	12	-0.02	-8.8	-0.02	-8.8	45	4.9	2.03	In-Tolerance
1000 lb	14	0.05	24.6	0.05	24.6	45	4.9	2.03	In-Tolerance
1000 lb	19	0.00	-0.6	0.00	-0.6	45	4.9	2.03	In-Tolerance
1000 lb	20	-0.02	-10.9	-0.02	-10.9	45	4.9	2.03	In-Tolerance
1000 lb	21	0.00	-1.9	0.00	-1.9	45	4.9	2.03	In-Tolerance
1000 lb	A	0.01	4.7	0.01	4.7	45	4.9	2.03	In-Tolerance
1000 lb	B	-0.02	-9.7	-0.02	-9.7	45	4.9	2.03	In-Tolerance
1000 lb	B18	0.07	30.7	0.07	30.7	45	4.9	2.03	In-Tolerance
1000 lb	D	0.03	11.9	0.03	11.9	45	4.9	2.03	In-Tolerance
1000 lb	E18	0.06	27.9	0.06	27.9	45	4.9	2.03	In-Tolerance
1000 lb	G8	0.02	11.0	0.02	11.0	45	4.9	2.03	In-Tolerance
1000 lb	I	0.03	14.8	0.03	14.8	45	4.9	2.03	In-Tolerance
1000 lb	K	0.01	4.5	0.01	4.5	45	4.9	2.03	In-Tolerance
1000 lb	M18	0.02	8.0	0.02	8.0	45	4.9	2.03	In-Tolerance
1000 lb	N	0.05	21.0	0.05	21.0	45	4.9	2.03	In-Tolerance
1000 lb	N18	0.08	36.3	0.08	36.3	45	4.9	2.03	In-Tolerance

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

 10/29/2020

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CALIBRATION CERTIFICATE

Calibrated for: **K Scale** Certificate number: **MP3995 Rev 1**
 Calibration Date: **10/29/2020** Purchase Order Number: **0**
 Environmental conditions at time of test:
Temperature: 22 °C Humidity: 45.5 % Pressure: 718mmhg
Test method used: SOP 8 Medium Accuracy Calibrations of Mass Standards by Modified Substitution, May 2019
Test equipment used: Lab standards traceable to NIST and MettlerAX205, Mettler PR503, Mettler AX206, Vaisala PTU301
Condition of Weights: Cleaned and painted

Artifact(s): 6 - 1000 lb weights

Nominal	SN/ID	Correction as Found		Correction as Left		NIST Class F Tolerance (g)	Uncertainty		Condition As Left
		lb	g	lb	g		g	k	
1000 lb	13	0.03	12.1	0.03	12.1	45	4.9	2.03	In-Tolerance
1000 lb	15	-0.03	-13.4	-0.03	-13.4	45	4.9	2.03	In-Tolerance
1000 lb	C	0.03	15.0	0.03	15.0	45	4.9	2.03	In-Tolerance
1000 lb	H18	0.16	70.4	0.00	0.9	45	4.9	2.03	Adjusted
1000 lb	K18	0.07	31.4	0.07	31.4	45	4.9	2.03	In-Tolerance
1000 lb	L1	0.15	69.0	0.00	0.2	45	4.9	2.03	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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Pierre SD 57501



CALIBRATION CERTIFICATE

Calibrated for: **K Scale** Certificate number: **MP3995 Rev 1**

Calibration Date: **10/29/2020** Purchase Order Number: **0**

Environmental conditions at time of test:

Temperature: 22 °C Humidity: 45.1 % Pressure: 717mmhg

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

Test equipment used: Lab standards traceable to NIST and Mettler AX205, Mettler PR503, Mettler AX206, Vaisala PTU301


Condition of Weights: Cleaned and painted

Artifact(s): **2 - 500 lb weights**

Nominal	SN/ID	Correction as Found		Correction as Left		NIST Class F Tolerance (g)	Uncertainty		Condition As Left
		lb	g	lb	g		g	k	
500 lb	A	0.01	4.7	0.01	4.7	23	2.6	2.09	In-Tolerance
500 lb	B	-0.02	-9.7	-0.02	-9.7	23	2.6	2.09	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

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CALIBRATION CERTIFICATE

Calibrated for: **K Scale** Certificate number: **MP3995 Rev 1**

Calibration Date: **10/27/2020** Purchase Order Number: **0**

Environmental conditions at time of test:

Temperature: 21.8 °C **Humidity:** 46.3 % **Pressure:** 717.9 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 through NIST, Mettler AX205, Mettler PR503, Mettler AX206, Vaisala PTU301

Condition of Weights: Cleaned and painted

Artifact(s): **22 - 50 lb Hanging Weights**

Nominal	SN/ID	Correction as Found mg	Correction as Left mg	NIST Class F Tolerance (mg)	Uncertainty mg	<i>k</i>	Condition As Left
50 lb	SD12	-844	-844	2300	217	2.04	In-Tolerance
50 lb	SD18	-74	-74	2300	217	2.04	In-Tolerance
50 lb	SD20	1151	1151	2300	217	2.04	In-Tolerance
50 lb	SD21	846	846	2300	217	2.04	In-Tolerance
50 lb	SD24	581	581	2300	217	2.04	In-Tolerance
50 lb	SD25	-1254	61	2300	217	2.04	Adjusted
50 lb	SD26	-549	-549	2300	217	2.04	In-Tolerance
50 lb	SD27	-339	-339	2300	217	2.04	In-Tolerance
50 lb	SD32	-469	-469	2300	217	2.04	In-Tolerance
50 lb	SD33	136	136	2300	217	2.04	In-Tolerance
50 lb	SD34	-5759	-4	2300	217	2.04	Adjusted
50 lb	SD35	716	716	2300	217	2.04	In-Tolerance
50 lb	SD37	-1249	-24	2300	217	2.04	Adjusted
50 lb	SD38	896	896	2300	217	2.04	In-Tolerance
50 lb	SD39	2211	-34	2300	217	2.04	Adjusted
50 lb	SD46	-149	-149	2300	217	2.04	In-Tolerance
50 lb	SD47	-5134	-9	2300	217	2.04	Adjusted
50 lb	SD49	836	836	2300	217	2.04	In-Tolerance
50 lb	SD50	2106	96	2300	217	2.04	Adjusted
50 lb	SD55	-1489	-1489	2300	217	2.04	In-Tolerance
50 lb	SD59	-1309	-14	2300	217	2.04	Adjusted
50 lb	SD91	911	911	2300	217	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

10/29/2020

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CALIBRATION CERTIFICATE

Calibrated for: **K Scale** Certificate number: **MP3995 Rev 1**
 Calibration Date: **10/28/2020** Purchase Order Number: **0**

Environmental conditions at time of test:

Temperature: 22.1 °C **Humidity:** 46.4 % **Pressure:** 717.2 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 through NIST, Mettler AX205, Mettler PR503, 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	2	-209	-209	2300	217	2.04	In-Tolerance
50 lb	3	-1119	-1119	2300	217	2.04	In-Tolerance
50 lb	4	-119	-119	2300	217	2.04	In-Tolerance
50 lb	5	-294	-294	2300	217	2.04	In-Tolerance
50 lb	6	-1854	91	2300	217	2.04	Adjusted
50 lb	7	-634	-634	2300	217	2.04	In-Tolerance
50 lb	8	-169	-169	2300	217	2.04	In-Tolerance
50 lb	10	416	416	2300	217	2.04	In-Tolerance
50 lb	11	-744	-744	2300	217	2.04	In-Tolerance
50 lb	13	156	156	2300	217	2.04	In-Tolerance
50 lb	15	1091	1091	2300	217	2.04	In-Tolerance
50 lb	16	541	541	2300	217	2.04	In-Tolerance
50 lb	17	411	411	2300	217	2.04	In-Tolerance
50 lb	18	-649	-649	2300	217	2.04	In-Tolerance
50 lb	18	-199	-199	2300	217	2.04	In-Tolerance
50 lb	20	-59	-59	2300	217	2.04	In-Tolerance
50 lb	21	-494	-494	2300	217	2.04	In-Tolerance
50 lb	22	-864	-864	2300	217	2.04	In-Tolerance
50 lb	24	126	126	2300	217	2.04	In-Tolerance
50 lb	25	321	321	2300	217	2.04	In-Tolerance
50 lb	27	86	86	2300	217	2.04	In-Tolerance
50 lb	28	-1434	6	2300	217	2.04	Adjusted
50 lb	29	96	96	2300	217	2.04	In-Tolerance
50 lb	31	696	696	2300	217	2.04	In-Tolerance
50 lb	32	-1214	-9	2300	217	2.04	Adjusted

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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: **MP3995 Rev 1**
Calibration Date: **10/28/2020** Purchase Order Number: **0**

Environmental conditions at time of test:

Temperature: 22.1 °C Humidity: 46.4 % Pressure: 717.2 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 through NIST, Mettler AX205, Mettler PR503, 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	33	-529	-529	2300	217	2.04	In-Tolerance
50 lb	34	-869	-869	2300	217	2.04	In-Tolerance
50 lb	36	146	146	2300	217	2.04	In-Tolerance
50 lb	38	-469	-469	2300	217	2.04	In-Tolerance
50 lb	39	266	266	2300	217	2.04	In-Tolerance
50 lb	40	-549	-549	2300	217	2.04	In-Tolerance
50 lb	41	-809	-809	2300	217	2.04	In-Tolerance
50 lb	44	151	151	2300	217	2.04	In-Tolerance
50 lb	45	-334	-334	2300	217	2.04	In-Tolerance
50 lb	47	-2289	116	2300	217	2.04	Adjusted
50 lb	48	-64	-64	2300	217	2.04	In-Tolerance
50 lb	50	-549	-549	2300	217	2.04	In-Tolerance
50 lb	51	-464	-464	2300	217	2.04	In-Tolerance
50 lb	52	-394	-394	2300	217	2.04	In-Tolerance
50 lb	53	-2564	21	2300	217	2.04	Adjusted
50 lb	96	-1094	-1094	2300	217	2.04	In-Tolerance
50 lb	97	-1064	-1064	2300	217	2.04	In-Tolerance
50 lb	98	-309	-309	2300	217	2.04	In-Tolerance
50 lb	99	-144	-144	2300	217	2.04	In-Tolerance
50 lb	321	-574	-574	2300	217	2.04	In-Tolerance
50 lb	333	-394	-394	2300	217	2.04	In-Tolerance
50 lb	1M	-404	-404	2300	217	2.04	In-Tolerance
50 lb	J	-829	-829	2300	217	2.04	In-Tolerance
50 lb	NM	2501	66	2300	217	2.04	Adjusted
50 lb	R	-544	-544	2300	217	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

 10/29/2020

Ron Peterson, Metrologist

Ver 20200812



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



CALIBRATION CERTIFICATE

Calibrated for: **K Scale** Certificate number: **MP3995 Rev 1**

Calibration Date: **10/28/2020** Purchase Order Number: **0**

Environmental conditions at time of test:

Temperature: 22 °C **Humidity:** 46 % **Pressure:** 717 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 through NIST, Mettler AX205, Mettler PR503, Mettler AX206, Vaisala PTU301

Condition of Weights: Cleaned and painted

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

Nominal	SN/ID	Correction as Found mg	Correction as Left mg	NIST Class F Tolerance (mg)	Uncertainty mg	<i>k</i>	Condition As Left
25 lb	1	1019	39	1100	109	2.06	Adjusted
25 lb	2	879	19	1100	109	2.06	Adjusted
25 lb	1PJ1	744	149	1100	109	2.06	Adjusted
25 lb	1PJ8	1119	119	1100	109	2.06	Adjusted
25 lb	1PJ9	889	24	1100	109	2.06	Adjusted
25 lb	1PJA	864	64	1100	109	2.06	Adjusted
25 lb	1PJB	-101	-101	1100	109	2.06	In-Tolerance
25 lb	1PJD	324	324	1100	109	2.06	In-Tolerance
25 lb	1PJE	729	729	1100	109	2.06	In-Tolerance
25 lb	1PJF	559	559	1100	109	2.06	In-Tolerance
25 lb	1PJG	714	714	1100	109	2.06	In-Tolerance
25 lb	1PJH	789	54	1100	109	2.06	Adjusted
25 lb	1PJJ	529	529	1100	109	2.06	In-Tolerance
25 lb	1PJK	-151	-151	1100	109	2.06	In-Tolerance
25 lb	1PJL	-111	-111	1100	109	2.06	In-Tolerance
25 lb	1PJM	819	-6	1100	109	2.06	Adjusted
25 lb	1PJN	114	114	1100	109	2.06	In-Tolerance
25 lb	1PJP	-81	-81	1100	109	2.06	In-Tolerance
25 lb	1PJQ	524	524	1100	109	2.06	In-Tolerance
25 lb	1PJR	634	634	1100	109	2.06	In-Tolerance
25 lb	1PJT	764	209	1100	109	2.06	Adjusted
25 lb	1PJV	-316	-316	1100	109	2.06	In-Tolerance
25 lb	1PJW	574	574	1100	109	2.06	In-Tolerance
25 lb	1PJZ	564	564	1100	109	2.06	In-Tolerance
25 lb	1PK2	514	514	1100	109	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

10/29/2020

Ron Peterson, Metrologist

Ver 20200812



CALIBRATION CERTIFICATE

Calibrated for: **K Scale**
Calibration Date: 10/28/2020

Certificate number: **MP3995 Rev 1**
Purchase Order Number: **0**

Environmental conditions at time of test:

Temperature: 22 °C Humidity: 46 % Pressure: 717 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 through NIST, Mettler AX205, Mettler PR503, Mettler AX206, Vaisala PTU301
Condition of Weights: Cleaned and painted

Artifact(s): **20 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	1PK4	464	464	1100	109	2.06	In-Tolerance
25 lb	1PK5	339	339	1100	109	2.06	In-Tolerance
25 lb	1PK6	874	874	1100	109	2.06	In-Tolerance
25 lb	1PK7	369	369	1100	109	2.06	In-Tolerance
25 lb	1PK8	549	549	1100	109	2.06	In-Tolerance
25 lb	1PK8	249	249	1100	109	2.06	In-Tolerance
25 lb	1PK9	394	394	1100	109	2.06	In-Tolerance
25 lb	1PKD	-91	-91	1100	109	2.06	In-Tolerance
25 lb	1PKE	49	49	1100	109	2.06	In-Tolerance
25 lb	1PKF	264	264	1100	109	2.06	In-Tolerance
25 lb	1PKG	-436	-436	1100	109	2.06	In-Tolerance
25 lb	1PKH	604	604	1100	109	2.06	In-Tolerance
25 lb	1PKI	169	169	1100	109	2.06	In-Tolerance
25 lb	1PKK	94	94	1100	109	2.06	In-Tolerance
25 lb	1PKL	289	289	1100	109	2.06	In-Tolerance
25 lb	1PKM	394	394	1100	109	2.06	In-Tolerance
25 lb	1PKN	-111	-111	1100	109	2.06	In-Tolerance
25 lb	1PKO	234	234	1100	109	2.06	In-Tolerance
25 lb	KS-D2	-351	-351	1100	109	2.06	In-Tolerance
25 lb	X	1339	34	1100	109	2.06	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 Peterson, Metrologist



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Office of Weights and Measures
Metrology Lab
Lab: 1500 N Garfield – E. Truck Bypass Phone: 605-773-3170
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Pierre SD 57501



CALIBRATION CERTIFICATE

Calibrated for: **K Scale** Certificate number: **MP3995 Rev 1**
 Calibration Date: **10/26/2020** Purchase Order Number: **0**

Environmental conditions at time of test:

Temperature: 20.7 °C **Humidity:** 48.9 % **Pressure:** 712.8 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 through NIST, Mettler AX205, Mettler PR503, Mettler AX206, Vaisala PTU301
Condition of Weights: Suitable for use. No significant wear or damage

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

Nominal	SN/ID	Correction as Found mg	Correction as Left mg	NIST Class F Tolerance (mg)	Uncertainty mg	k	Condition As Left
5 lb	9	29	29	230	20	2.06	In-Tolerance
2 lb	5	11.2	11.2	91	8.1	2.06	In-Tolerance
2 lb	6	28.2	28.2	91	8.1	2.06	In-Tolerance
1 lb	4	11.4	11.4	70	6.3	2.06	In-Tolerance
0.5 lb	3	3.2	3.2	45	4.1	2.06	In-Tolerance
0.2 lb	1	8.5	8.5	18	1.6	2.06	In-Tolerance
0.2 lb	2	8.3	8.3	18	1.6	2.06	In-Tolerance
0.1 lb		7.3	7.3	9.1	0.8	2.06	In-Tolerance
0.05 lb		2.29	2.29	4.5	0.39	2.06	In-Tolerance
0.02 lb		1.39	1.39	1.8	0.16	2.06	In-Tolerance
0.02 lb	.	0.85	0.85	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		0.94	0.94	1.2	0.13	2.04	In-Tolerance
0.002 lb		0.528	0.528	0.87	0.079	2.04	In-Tolerance
0.002 lb	.	0.658	0.658	0.87	0.079	2.04	In-Tolerance
0.001 lb		0.046	0.046	0.7	0.062	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

10/29/2020
 Ron Peterson, Metrologist



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



CALIBRATION CERTIFICATE

Calibrated for: K Scale **Certificate number:** MP3995 Rev 1

Calibration Date: 10/26/2020 **Purchase Order Number:** 0

Environmental conditions at time of test:

Temperature: 20.7 °C **Humidity:** 48.9 % **Pressure:** 712.8 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 through NIST, Mettler AX205, Mettler PR503, Mettler AX206, Vaisala PTU301

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

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

Nominal	SN/ID	Correction as Found	Correction as Left	NIST Class F	Uncertainty	k	Condition As Left
		mg	mg	Tolerance (mg)	mg		
10 lb		122	122	450	39	2.06	In-Tolerance
10 lb	.	129	129	450	39	2.06	In-Tolerance
5 lb		80	80	230	20	2.06	In-Tolerance
2 lb		32.2	32.2	91	8.1	2.06	In-Tolerance
2 lb	.	26.2	26.2	91	8.1	2.06	In-Tolerance
1 lb		9.4	9.4	70	6.3	2.06	In-Tolerance
0.5 lb		10.2	10.2	45	4.1	2.06	In-Tolerance
0.2 lb		0.5	0.5	18	1.6	2.06	In-Tolerance
0.2 lb	.	3.2	3.2	18	1.6	2.06	In-Tolerance
0.1 lb		3.07	3.07	9.1	0.80	2.06	In-Tolerance
0.05 lb		1.25	1.25	4.5	0.39	2.06	In-Tolerance
0.02 lb		0.47	0.47	1.8	0.16	2.06	In-Tolerance
0.02 lb	.	0.44	0.44	1.8	0.16	2.06	In-Tolerance
0.01 lb		0.39	0.39	1.5	0.13	2.06	In-Tolerance
0.005 lb		0.64	0.64	1.2	0.13	2.04	In-Tolerance
0.002 lb		0.228	0.228	0.87	0.079	2.04	In-Tolerance
0.002 lb	.	0.258	0.258	0.87	0.079	2.04	In-Tolerance
0.001 lb		0.396	0.396	0.7	0.062	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

10/29/2020
Ron Peterson, Metrologist



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



CALIBRATION CERTIFICATE

Calibrated for: **K Scale** Certificate number: **MP3995 Rev 1**

Calibration Date: **10/26/2020** Purchase Order Number: **0**

Environmental conditions at time of test:

Temperature: 20.7 °C **Humidity:** 48.9 % **Pressure:** 712.8 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 through NIST, Mettler AX205, Mettler PR503, Mettler AX206, Vaisala PTU301
Condition of Weights: Suitable for use. No significant wear or damage

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

Nominal	SN/ID	Correction as Found	Correction as Left	NIST Class F	Uncertainty	k	Condition As Left
		mg	mg	Tolerance (mg)	mg		
10 lb	KS	-119	-119	450	39	2.06	In-Tolerance
10 lb	12	37	37	450	39	2.06	In-Tolerance
5 lb		24	24	230	20	2.06	In-Tolerance
1 lb	8	6.4	6.4	70	6.3	2.06	In-Tolerance
1 lb	3	-14.6	-14.6	70	6.3	2.06	In-Tolerance
1 lb	5	16.4	16.4	70	6.3	2.06	In-Tolerance
1 lb	1	2.4	2.4	70	6.3	2.06	In-Tolerance
1 lb	4	-6.6	-6.6	70	6.3	2.06	In-Tolerance
4 oz	2	7.4	7.4	23	2.0	2.06	In-Tolerance
4 oz	3	10.5	10.5	23	2.0	2.06	In-Tolerance
4 oz	1	0.0	0.0	23	2.0	2.06	In-Tolerance
1 oz	3	2.01	2.01	5.4	0.47	2.06	In-Tolerance
1 oz		1.80	1.80	5.4	0.47	2.06	In-Tolerance
1/2 oz		1.31	1.31	2.8	0.25	2.06	In-Tolerance
1/2 oz	.	0.18	0.18	2.8	0.25	2.06	In-Tolerance
1/4 oz		0.22	0.22	1.7	0.15	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

10/29/2020
 Ron Peterson, Metrologist



CALIBRATION CERTIFICATE

Calibrated for: K Scale **Certificate number:** MP3995 Rev 1
Calibration Date: 10/26/2020 **Purchase Order Number:** 0

Environmental conditions at time of test:

Temperature: 20.7 °C **Humidity:** 48.9 % **Pressure:** 712.8 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 through NIST, Mettler AX205, Mettler PR503, Mettler AX206, Vaisala PTU301
Condition of Weights: Suitable for use. No significant wear or damage

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

Nominal	SN/ID	Correction as Found mg	Correction as Left mg	NIST Class F Tolerance (mg)	Uncertainty mg	<i>k</i>	Condition As Left
8 oz	1	11.2	11.2	45	4.1	2.06	In-Tolerance
8 oz	2	14.2	14.2	45	4.1	2.06	In-Tolerance
8 oz	3	20.2	20.2	45	4.1	2.06	In-Tolerance
8 oz	4	24.2	24.2	45	4.1	2.06	In-Tolerance
8 oz	5	22.2	22.2	45	4.1	2.06	In-Tolerance
8 oz	6	24.2	24.2	45	4.1	2.06	In-Tolerance
8 oz	7	21.2	21.2	45	4.1	2.06	In-Tolerance
8 oz	8	22.2	22.2	45	4.1	2.06	In-Tolerance
8 oz	9	16.2	16.2	45	4.1	2.06	In-Tolerance
8 oz	10	15.2	15.2	45	4.1	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

 10/29/2020
Ron Peterson, Metrologist



South Dakota Department of Public Safety
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 Pierre SD 57501



CALIBRATION CERTIFICATE

Calibrated for: **K Scale** Certificate number: **MP3995 Rev 1**
 Calibration Date: 10/27/2020 Purchase Order Number: 0

Environmental conditions at time of test:

Temperature: 21.8 °C Humidity: 45.4 % Pressure: 712.7 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 through NIST, Mettler AX205, Mettler PR503, Mettler AX206, Vaisala PTU301
 Condition of Weights: Suitable for use. No significant wear or damage

Artifact(s): **14 piece Metric Class F 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		95	95	200	18	2.06	In-Tolerance
1 kg		43.1	43.1	100	8.8	2.06	In-Tolerance
500 g		34.4	34.4	70	6.2	2.06	In-Tolerance
200 g		16.4	16.4	40	3.5	2.06	In-Tolerance
200 g		15.4	15.4	40	3.5	2.06	In-Tolerance
100 g		7.3	7.3	20	1.7	2.06	In-Tolerance
50 g		3.41	3.41	10	0.87	2.06	In-Tolerance
20 g		1.14	1.14	4	0.35	2.06	In-Tolerance
20 g		1.03	1.03	4	0.35	2.06	In-Tolerance
10 g		0.86	0.86	2	0.18	2.06	In-Tolerance
5 g		0.40	0.40	1.5	0.13	2.06	In-Tolerance
2 g		0.20	0.20	1.1	0.10	2.06	In-Tolerance
2 g		0.31	0.31	1.1	0.10	2.06	In-Tolerance
1 g		-0.534	-0.534	0.9	0.080	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

 10/29/2020
 Ron Peterson, Metrologist

Ver 20200812



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Pierre SD 57501



CALIBRATION CERTIFICATE

Calibrated for: **K Scale** Certificate number: **MP3995 Rev 1**

Calibration Date: **10/27/2020** Purchase Order Number: **0**

Environmental conditions at time of test:

Temperature: 22.1 °C Humidity: 44.1 % Pressure: 712.7 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 through NIST, MettlerAX205, Mettler PR503, Mettler AX206, Vaisala PTU301

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

Artifact(s):

16 piece Metric Class F 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		134	134	500	44	2.06	In-Tolerance
2 kg		82	82	200	18	2.06	In-Tolerance
2 kg		88	88	200	18	2.06	In-Tolerance
1 kg		53.1	53.1	100	8.8	2.06	In-Tolerance
500 g		25.4	25.4	70	6.2	2.06	In-Tolerance
200 g		18.1	18.1	40	3.5	2.06	In-Tolerance
200 g		18.0	18.0	40	3.5	2.06	In-Tolerance
100 g		2.0	2.0	20	1.7	2.06	In-Tolerance
50 g		2.66	2.66	10	0.87	2.06	In-Tolerance
20 g		0.98	0.98	4	0.35	2.06	In-Tolerance
20 g		0.69	0.69	4	0.35	2.06	In-Tolerance
10 g		0.98	0.98	2	0.18	2.06	In-Tolerance
5 g		0.19	0.19	1.5	0.13	2.06	In-Tolerance
2 g		0.46	0.46	1.1	0.10	2.06	In-Tolerance
2 g		0.33	0.33	1.1	0.10	2.06	In-Tolerance
1 g		0.096	0.096	0.9	0.080	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

 10/29/2020

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CALIBRATION CERTIFICATE

Calibrated for: **K Scale**

Certificate number: **MP3995 Rev 1**

Calibration Date: **10/27/2020**

Purchase Order Number: **0**

Environmental conditions at time of test:

Temperature: **22.1 °C**

Humidity: **44.1 %**

Pressure: **712.7 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 through NIST, MettlerAX205, Mettler PR503, Mettler AX206, Vaisala PTU301**

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

Artifact(s):

22 piece Metric Class F 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	18	2.06	In-Tolerance
2 kg	2	90	90	200	18	2.06	In-Tolerance
2 kg	3	80	80	200	18	2.06	In-Tolerance
2 kg	4	91	91	200	18	2.06	In-Tolerance
2 kg	5	75	75	200	18	2.06	In-Tolerance
1 kg		41.1	41.1	100	8.8	2.06	In-Tolerance
500 g	1	32.4	32.4	70	6.2	2.06	In-Tolerance
500 g	2	30.4	30.4	70	6.2	2.06	In-Tolerance
500 g	3	15.4	15.4	70	6.2	2.06	In-Tolerance
500 g	4	28.4	28.4	70	6.2	2.06	In-Tolerance
500 g	5	32.4	32.4	70	6.2	2.06	In-Tolerance
200 g		12.7	12.7	40	3.5	2.06	In-Tolerance
200 g	.	10.7	10.7	40	3.5	2.06	In-Tolerance
100 g		9.8	9.8	20	1.7	2.06	In-Tolerance
50 g		4.24	4.24	10	0.87	2.06	In-Tolerance
20 g		1.20	1.20	4	0.35	2.06	In-Tolerance
20 g	.	1.80	1.80	4	0.35	2.06	In-Tolerance
10 g		0.98	0.98	2	0.18	2.06	In-Tolerance
5 g		0.91	0.91	1.5	0.13	2.06	In-Tolerance
2 g		0.49	0.49	1.1	0.10	2.06	In-Tolerance
2 g	.	-0.03	-0.03	1.1	0.10	2.06	In-Tolerance
1 g		-0.434	-0.434	0.9	0.080	2.06	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

 10/29/2020
 Ron Peterson, Metrologist



CALIBRATION CERTIFICATE

Calibrated for: **K Scale** Certificate number: **MP3995 Rev 1**

Calibration Date: **10/29/2020** Purchase Order Number: **0**

Environmental conditions at time of test:

Temperature: 21.9 °C **Humidity:** 47.1 % **Pressure:** 715.6 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 through NIST, Mettler AX205, Mettler PR503, Mettler AX206, Vaisala PTU301
Condition of Weights: Suitable for use. No significant wear or damage

Artifact(s): **5 loose weights**

Nominal	SN/ID	Correction as Found	Correction as Left	NIST Class F	Uncertainty	k	Condition As Left
		mg	mg	Tolerance (mg)	mg		
10 lb	58	-186	-186	450	39	2.06	In-Tolerance
10 lb	KS1	-143	-143	450	39	2.06	In-Tolerance
20 lb	57	-43	-43	910	95	2.06	In-Tolerance
20 kg	Y	-100	-100	2000	183	2.05	In-Tolerance
5 kg	1E	-38	-38	500	44	2.06	In-Tolerance

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