TROEMNER
Troemner, LLC

ISO/IEC 17025 Calibration Certificate

201 Wolf Drive • P.O. Box 87 • Thorofare, NJ 08086-0087 • Phone: 856-686-1600 • Fax: 856-686-1601 • www.troemner.com • e-mail: troemner@troemner.com

Weight

ID Number	04629
Certificate Number	01171931-1
Date of Calibration	04-Dec-2020

SECTION 1: NAME AND ADDRESS OF CUSTOMER

End user
BLDG 90 RM 230-14 SEGAL
12000 Jefferson Ave
Eel Bldg 90
Newport News VA 23606

Client
Grainger
MW-H 11
Palatine IL 60038-0001

SECTION 2: APPROVED SIGNATORY

Jilliann Shipe, Metrologist

SECTION 3: PERSON PERFORMING WORK

Robotic Calibration

SECTION 4: CERTIFICATE INFORMATION

Description of Masses: Cal-Pak

Accuracy Class	:	ASTM E617-13 Class 1	Date Received	:	02-Dec-2020
Order Number	:	20A1135100-471	Date of Calibration	:	04-Dec-2020
Construction	:	One Piece, Two Piece	Date of Issue	:	07-Dec-2020
Material	:	Stainless Steel	Weight Range	:	200mg-50g
Serial Number	:	04629			

SECTION 5: ENVIRONMENTAL CONDITIONS DURING TEST

Temperature: 21.97 °C Pressure: 761.99 mm Hg Relative Humidity: 48%

SECTION 6: PERTINENT INFORMATION

The Weights listed on this calibration report have been compared to reference mass standards that are traceable to the SI through the National Institute of Standards and Technology under Test No. 684/289871-17.

Reference standards and balances used to perform the calibration are listed in Section 10.

The weights calibrated for this report have been calibrated in accordance with Troemner's calibration process. The calibration performed meets the criteria as described in the current revisions of ASTM E617 and OIML R111.

This calibration also meets specifications as outlined in ISO/IEC 17025, ANSI/NCSL Z540-1-1994, and applicable documents.

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SECTION 7: TRUE MASS (MASS IN VACUUM) CALIBRATION DATA

Nominal Mass Value	Serial Number	True Mass	Density [1] of Weight	Uncertainty (+ or -)
50 g		50.000030 g	8.0300 g/cm^3	0.025 mg
5 g		5.0000004 g	8.0300 g/cm^3	0.0070 mg
200 mg		0.2000020 g	7.9500 g/cm^3	0.0025 mg

1 Density is assumed unless otherwise stated

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SECTION 8: CONVENTIONAL MASS CALIBRATION VALUE VS. REFERENCE DENSITY 8000 kg/m³

Nominal Mass Value	Serial Number	Conventional Mass Value	Uncertainty (+ or -)	Tolerance (+ or -)
50 g		50.000058 g	0.025 mg	0.1200 mg
5 g		5.0000031 g	0.0070 mg	0.0340 mg
200 mg		0.2000018 g	0.0025 mg	0.0100 mg

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SECTION 9: CONVENTIONAL MASS CALIBRATION DATA VS. REFERENCE DENSITY 8000 kg/m³

Nominal Mass Value	Serial Number	Conventional Mass Correction	Uncertainty (+ or -)	Tolerance (+ or -)
50 g		0.058 mg	0.025 mg	0.1200 mg
5 g		0.0031 mg	0.0070 mg	0.0340 mg
200 mg		0.0018 mg	0.0025 mg	0.0100 mg

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SECTION 10: CALIBRATION PROCEDURE DATA

Nominal Mass Value	Serial Number	Standard Set No.	Cal Due	Balance Used	Cal Due	Procedure Used
50 g		T3	01-Jul-2021	AX206-142	01-Jul-2021	Multi A-B
5 g		T3	01-Jul-2021	AX206-142	01-Jul-2021	Multi A-B
200 mg		S120A	01-Sep-2021	A5XL-134	01-Jan-2021	Multi A-B

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SECTION 11: GENERAL INFORMATION

This calibration was performed in Troemner's High Precision Level I Mass Metrology Laboratory at 201 Wolf Drive, Thorofare, New Jersey 08086 unless otherwise noted on the Addendum. The internal procedures used are CAL-CLASSI and METR-MAP.

SECTION 12: DEFINITIONS AND TERMS

TRUE MASS - The mass of a weight as if it were measured in a vacuum. Also known as Mass in a Vacuum.

CONVENTIONAL MASS - The conventional value of the result of weighing in air in accordance to International Recommendation OIML D 28. For a weight taken at 20 °C, the conventional mass is the mass of a reference weight of a density of 8000 kg/m³ which it balances in air of a density of 1.2 kg/m³.

AS FOUND TRUE MASS - The measured value of the mass(es) as they were received by Troemner.

AS LEFT TRUE MASS - The measured value of the mass(es) after adjustment, repair, or replacement when necessary. The As Found True Mass will equal the As Left True Mass if the mass(es) did not require adjustment, repair or replacement.

NOMINAL MASS - The mass value as marked on the weight.

CORRECTION - The difference between the conventional mass value of a weight and its nominal value. A positive correction indicates that the conventional mass value is greater than the nominal value by the amount of the correction.

AS FOUND CONVENTIONAL MASS CORRECTION - The conventional correction of the result, as it was received by Troemner, of weighing in air in accordance to International Recommendation D 28. For a weight taken at 20 °C, the conventional mass is the mass of a reference weight of density 8000 kg/m³. which it balances in air density of 1.2 kg/m³. If the customer requires cleaning prior to calibration, the after cleaning correction would be reported.

AS LEFT CONVENTIONAL MASS CORRECTION - The conventional correction of the result, after adjust-, ment repair, or replacement of weighing in air in accordance to International Recommendation D 28. For a weight taken at 20 °C, the conventional mass is the mass of a reference weight of density 8000 kg/m³ which it balances in air density of 1.2 kg/m³. The As Found will equal the As Left Conventional Mass Correction if the mass(es) did not require adjustment, repair or replacement.

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SECTION 12: DEFINITIONS AND TERMS (continued)

UNCERTAINTY - Non-negative parameter characterizing the dispersion of the quantity values being attributed to a measurand, based on the information used. The uncertainty is calculated in accordance with NIST TechNote 1297 using a coverage factor of $k = 2$ ($k = 2$ defines an interval having a level of confidence of approximately 95 percent). The uncertainty does not include possible effects of magnetism.

TOLERANCE - Defines the limits in which the correction value and the uncertainty must fall to meet the tolerance specification for the given Class.

AS FOUND CONVENTIONAL MASS VALUE - The measured value of the mass(es) as they were received by Troemner, of weighing in air in accordance to International Recommendation OIML D 28. For a weight taken at 20 °C, the conventional mass is the mass of a reference weight of density 8000 kg/m³ which it balances in air density of 1.2 kg/m³. If the customer requires cleaning prior to calibration, the after cleaning value would be reported.

AS LEFT CONVENTIONAL MASS VALUE - The measured value of the mass(es) after they were adjusted, repaired or replaced when necessary, of weighing in air in accordance to International Recommendation OIML D 28. For a weight taken at 20 °C, the Conventional Mass is the mass of a reference weight of density 8000 kg/m³ which it balances in air density of 1.2 kg/m³. The As Found will equal the As Left Conventional Mass Value if the mass(es) did not require adjustment, repair or replacement.

ASTM E617 - Weights meet the tolerance specification for ASTM E617. Weights 2kg - 1g screened for magnetism using a Gaussmeter.