

# 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

Page 1 of 7 Pages  
**Weight**

Certificate Number 897748B-1  
Date of Calibration 21-JUL-2016

## SECTION 1: NAME AND ADDRESS OF CUSTOMER

End user  
A-1 Scale Co.  
3287 Sherman Way  
Slinger WI 53086

Client  
A-1 Scale Co  
3287 Sherman Way  
Slinger WI 53086

## SECTION 2: APPROVED SIGNATORY

  
Lynn Dickerson, Metrologist

## SECTION 3: PERSON PERFORMING WORK

Robotic Calibration

## SECTION 4: CERTIFICATE INFORMATION

Description of Masses: Analytical Weight Set

Accuracy Class	: ASTM E617 Class 1	Date Received	: 14-JUL-2016
Order Number	: 157763	Date of Calibration	: 21-JUL-2016
Construction	: One Piece, Two Piece	Date of Issue	: 21-JUL-2016
Material	: Stainless Steel	Weight Range	: 50mg-100g
	: Aluminum		: 1mg-20mg
Serial Number	: 37619		

## SECTION 5: ENVIRONMENTAL CONDITIONS DURING TEST

Temperature: 21.54 °C      Pressure: 764.52 mm Hg      Relative Humidity: 51%

## 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. 822-275872-11.

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 Echelon I criteria as described in the NIST/NVLAP Technical Guide 150-2.

This calibration also meets specifications as outlined in ISO 9001, ISO/IEC 17025, ANSI/NCSL Z540-1-1994, and applicable documents.

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 Slinger WI 53086

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

Nominal Mass Value	Notes	Serial Number	----- As Found	True Mass	----- As Left	Density <sup>1</sup> of Weight	Uncertainty ( + or - )
100 g			99.999951 g		99.999951 g	8.0300 g/cm <sup>3</sup>	0.050 mg
50 g			49.999938 g		49.999938 g	8.0300 g/cm <sup>3</sup>	0.025 mg
20 g			19.999984 g		19.999984 g	8.0300 g/cm <sup>3</sup>	0.015 mg
20 g	*F		19.999789 g		19.999989 g	8.0300 g/cm <sup>3</sup>	0.015 mg
10 g			9.999996 g		9.999996 g	8.0300 g/cm <sup>3</sup>	0.010 mg
5 g			5.0000105 g		5.0000105 g	8.0300 g/cm <sup>3</sup>	0.0070 mg
2 g			2.0000266 g		2.0000266 g	8.0300 g/cm <sup>3</sup>	0.0060 mg
2 g	*		2.0000245 g		2.0000245 g	8.0300 g/cm <sup>3</sup>	0.0060 mg
1 g			0.9999999 g		0.9999999 g	8.0300 g/cm <sup>3</sup>	0.0060 mg
500 mg	F		0.5000090 g		0.4999940 g	7.9500 g/cm <sup>3</sup>	0.0025 mg
200 mg			0.2000042 g		0.2000042 g	7.9500 g/cm <sup>3</sup>	0.0025 mg
200 mg	*		0.1999972 g		0.1999972 g	7.9500 g/cm <sup>3</sup>	0.0025 mg
100 mg			0.0999999 g		0.0999999 g	7.9500 g/cm <sup>3</sup>	0.0025 mg
50 mg			0.0499975 g		0.0499975 g	7.9500 g/cm <sup>3</sup>	0.0025 mg
20 mg			0.0200019 g		0.0200019 g	2.7000 g/cm <sup>3</sup>	0.0020 mg
20 mg	*		0.0200023 g		0.0200023 g	2.7000 g/cm <sup>3</sup>	0.0020 mg
10 mg			0.0099999 g		0.0099999 g	2.7000 g/cm <sup>3</sup>	0.0020 mg
5 mg			0.0050030 g		0.0050030 g	2.7000 g/cm <sup>3</sup>	0.0020 mg
2 mg			0.0020073 g		0.0020073 g	2.7000 g/cm <sup>3</sup>	0.0020 mg
2 mg	*		0.0019966 g		0.0019966 g	2.7000 g/cm <sup>3</sup>	0.0020 mg
1 mg			0.0010016 g		0.0010016 g	2.7000 g/cm <sup>3</sup>	0.0020 mg

1 Density is assumed unless otherwise stated

\* Denotes weight is marked with a dot. F Denotes failed As Found tolerance test.

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## SECTION 8: CONVENTIONAL MASS CALIBRATION VALUE VS. REFERENCE DENSITY 8000 kg/m<sup>3</sup>

Nominal Mass Value	Notes	Serial Number	---- Conventional Mass Value ---- As Found As Left		Uncertainty ( + or - )	Tolerance ( + or - )
100 g			100.000007 g	100.000007 g	0.050 mg	0.2500 mg
50 g			49.999966 g	49.999966 g	0.025 mg	0.1200 mg
20 g			19.999995 g	19.999995 g	0.015 mg	0.0740 mg
20 g	*F		19.999800 g	20.000001 g	0.015 mg	0.0740 mg
10 g			10.000002 g	10.000002 g	0.010 mg	0.0500 mg
5 g			5.0000133 g	5.0000133 g	0.0070 mg	0.0340 mg
2 g			2.0000277 g	2.0000277 g	0.0060 mg	0.0340 mg
2 g	*		2.0000256 g	2.0000256 g	0.0060 mg	0.0340 mg
1 g			1.0000005 g	1.0000005 g	0.0060 mg	0.0340 mg
500 mg	F		0.5000085 g	0.4999935 g	0.0025 mg	0.0100 mg
200 mg			0.2000040 g	0.2000040 g	0.0025 mg	0.0100 mg
200 mg	*		0.1999970 g	0.1999970 g	0.0025 mg	0.0100 mg
100 mg			0.0999998 g	0.0999998 g	0.0025 mg	0.0100 mg
50 mg			0.0499974 g	0.0499974 g	0.0025 mg	0.0100 mg
20 mg			0.0199960 g	0.0199960 g	0.0020 mg	0.0100 mg
20 mg	*		0.0199964 g	0.0199964 g	0.0020 mg	0.0100 mg
10 mg			0.0099970 g	0.0099970 g	0.0020 mg	0.0100 mg
5 mg			0.0050015 g	0.0050015 g	0.0020 mg	0.0100 mg
2 mg			0.0020067 g	0.0020067 g	0.0020 mg	0.0100 mg
2 mg	*		0.0019960 g	0.0019960 g	0.0020 mg	0.0100 mg
1 mg			0.0010013 g	0.0010013 g	0.0020 mg	0.0100 mg

\* Denotes weight is marked with a dot. F Denotes failed As Found tolerance test.

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## SECTION 9: CONVENTIONAL MASS CALIBRATION DATA VS. REFERENCE DENSITY 8000 kg/m<sup>3</sup>

Nominal Mass Value	Notes	Serial Number	-- Conventional Mass Correction --		Uncertainty ( + or - )	Tolerance ( + or - )
			As Found	As Left		
100 g			0.007 mg	0.007 mg	0.050 mg	0.2500 mg
50 g			-0.034 mg	-0.034 mg	0.025 mg	0.1200 mg
20 g			-0.005 mg	-0.005 mg	0.015 mg	0.0740 mg
20 g	*F		-0.200 mg	0.001 mg	0.015 mg	0.0740 mg
10 g			0.002 mg	0.002 mg	0.010 mg	0.0500 mg
5 g			0.0133 mg	0.0133 mg	0.0070 mg	0.0340 mg
2 g			0.0277 mg	0.0277 mg	0.0060 mg	0.0340 mg
2 g	*		0.0256 mg	0.0256 mg	0.0060 mg	0.0340 mg
1 g			0.0005 mg	0.0005 mg	0.0060 mg	0.0340 mg
500 mg	F		0.0085 mg	-0.0065 mg	0.0025 mg	0.0100 mg
200 mg			0.0040 mg	0.0040 mg	0.0025 mg	0.0100 mg
200 mg	*		-0.0030 mg	-0.0030 mg	0.0025 mg	0.0100 mg
100 mg			-0.0002 mg	-0.0002 mg	0.0025 mg	0.0100 mg
50 mg			-0.0026 mg	-0.0026 mg	0.0025 mg	0.0100 mg
20 mg			-0.0040 mg	-0.0040 mg	0.0020 mg	0.0100 mg
20 mg	*		-0.0036 mg	-0.0036 mg	0.0020 mg	0.0100 mg
10 mg			-0.0030 mg	-0.0030 mg	0.0020 mg	0.0100 mg
5 mg			0.0015 mg	0.0015 mg	0.0020 mg	0.0100 mg
2 mg			0.0067 mg	0.0067 mg	0.0020 mg	0.0100 mg
2 mg	*		-0.0040 mg	-0.0040 mg	0.0020 mg	0.0100 mg
1 mg			0.0013 mg	0.0013 mg	0.0020 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
100 g		MS002	07/01/17	A200XXL-132	01/01/17	Multi A-B
50 g		MS002	07/01/17	A200XXL-132	01/01/17	Multi A-B
20 g		MS002	07/01/17	A200XXL-132	01/01/17	Multi A-B
20 g *		MS002	07/01/17	A200XXL-132	01/01/17	Multi A-B
10 g		MS002	07/01/17	A200XXL-132	01/01/17	Multi A-B
5 g		MS002	07/01/17	A200XXL-132	01/01/17	Multi A-B
2 g		A031	07/01/17	A5XL-131	01/01/17	Multi A-B
2 g *		A031	07/01/17	A5XL-131	01/01/17	Multi A-B
1 g		A031	07/01/17	A5XL-131	01/01/17	Multi A-B
500 mg		A031	07/01/17	A5XL-131	01/01/17	Multi A-B
200 mg		A031	07/01/17	A5XL-131	01/01/17	Multi A-B
200 mg *		A031	07/01/17	A5XL-131	01/01/17	Multi A-B
100 mg		A031	07/01/17	A5XL-131	01/01/17	Multi A-B
50 mg		A031	07/01/17	A5XL-131	01/01/17	Multi A-B
20 mg		A031	07/01/17	A5XL-131	01/01/17	Multi A-B
20 mg *		A031	07/01/17	A5XL-131	01/01/17	Multi A-B
10 mg		A031	07/01/17	A5XL-131	01/01/17	Multi A-B
5 mg		A031	07/01/17	A5XL-131	01/01/17	Multi A-B
2 mg		A031	07/01/17	A5XL-131	01/01/17	Multi A-B
2 mg *		A031	07/01/17	A5XL-131	01/01/17	Multi A-B
1 mg		A031	07/01/17	A5XL-131	01/01/17	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 page one. The internal procedures used are CAL-CLASSI and NIST HB145.

## 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/m<sup>3</sup> which it balances in air of a density of 1.2 kg/m<sup>3</sup>.

**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/m<sup>3</sup> which it balances in air density of 1.2 kg/m<sup>3</sup>. 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 adjustment, 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/m<sup>3</sup> which it balances in air density of 1.2 kg/m<sup>3</sup>. The As Found will equal the As Left Conventional Mass Correction if the mass(es) did not require adjustment, repair or replacement.

*(continued on next page)*



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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 / UKAS M3003 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/m<sup>3</sup> which it balances in air density of 1.2 kg/m<sup>3</sup>. 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/m<sup>3</sup> which it balances in air density of 1.2 kg/m<sup>3</sup>. 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.

## SECTION 13: ADDENDUM

500mg weight found out of tolerance; wiped and recalibrated.