



SCOPE OF ACCREDITATION TO ISO/IEC 17025:2005
& ANSI/NCSL Z540-1-1994

NORTHERN BALANCE AND SCALE, INC.
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CALIBRATION

Valid To: August 31, 2018

Certificate Number: 1684.01

In recognition of the successful completion of the A2LA evaluation process, accreditation is granted to this laboratory to perform the following calibrations¹:

I. Chemical

Parameter/Equipment	Range	CMC ² (±)	Comments
pH Meter ³	(0 to 14) pH	0.033 pH	HANNA HI931001 pH/mV calibrator

II. Mechanical

Parameter/Equipment	Range	CMC ² (±)	Comments
Mass – Fixed Points	1 mg 2 mg 3 mg 5 mg 10 mg 20 mg 30 mg 50 mg 100 mg 200 mg 300 mg 500 mg	1.4 µg 1.4 µg 1.5 µg 1.5 µg 1.4 µg 2.1 µg 2.4 µg 1.6 µg 1.6 µg 2.2 µg 2.1 µg 2.5 µg	NIST SOP 4 double substitution with ASTM Class 0 weights.

Parameter/Equipment	Range	CMC ² (±)	Comments
Mass – (cont)			
Fixed Points	1 g	8.3 µg	NIST SOP 4 double substitution with ASTM Class 0 weights.
	2 g	9.1 µg	
	3 g	5.8 µg	
	5 g	6.0 µg	
	10 g	10 µg	
	20 g	13 µg	
	30 g	21 µg	
	50 g	26 µg	
	100 g	77 µg	
	200 g	86 µg	
	300 g	90 µg	
	500 g	0.17 mg	
	1 kg	0.50 mg	
	2 kg	1.4 mg	
	3 kg	1.5 mg	
	5 kg	1.5 mg	
	10 kg	4.1 mg	
	25 kg	14 mg	
	30 kg	14 mg	
	22.6 kg (50 lb)	100 mg	NIST SOP 4 double substitution with NIST Class F weight
	11.4 kg (25 lb)	64 mg	
	4.5 kg (10 lb)	3 mg	
	2.3 kg (5 lb)	2 mg	
	907 g (2 lb)	0.8 mg	
	453 g (1 lb)	0.3 mg	
	226 g (8 oz)	0.2 mg	
	113 g (4 oz)	0.10 mg	
	56.7 g (2 oz)	0.05 mg	
	28.3 g (1 oz)	0.07 mg	
	14.2 g (1/2 oz)	0.07 mg	
	7.09 g (1/4 oz)	0.07 mg	
	3.54 (1/8 oz)	0.07 mg	
	1.77 g (1/16 oz)	0.10 mg	
	0.886 g (1/32 oz)	0.07 mg	
	90.7 g (0.2 lb)	0.10 mg	
	45.4 g (0.1 lb)	0.10 mg	
	22.7 g (0.05 lb)	0.10 mg	
	9.07 g (0.02 lb)	0.10 mg	
	4.54 g (0.01 lb)	0.10 mg	
	2.27 g (0.005 lb)	0.10 mg	
	0.907 g (0.002 lb)	0.10 mg	
	0.454 g (0.001 lb)	0.10 mg	

Parameter /Equipment	Range	CMC ² (±)	Comments
Scales ³ – Class III	(0 to 5) lb [(1.4 to 2.3) kg] (6 to 10) lb [(2.7 to 4.5) kg] (11 to 30) lb [(4.9 to 11.4) kg] (30 to 50) lb [(11.7 to 22.6) kg] (51 to 100) lb [(23.1 to 45.3) kg] (201 to 500) lb [(91.1 to 226) kg] (501 to 1000) lb [(227 to 453) kg] (1001 to 5000) lb [(454 to 2267) kg] (5001 to 10 000) lb [(2268 to 4535) kg] (10 001 to 20 000) lb [(4536 to 9071) kg]	0.0015 lb 0.0031 lb 0.015 lb 0.015 lb 0.031 lb 0.15 lb 0.31 lb 1.5 lb 1.5 lb 7.6 lb	NIST Handbook 44 verification using NIST Class F weights
Balances ³ Class I Class II	 (0 to 6) g (7 to 200) g (201 to 500) g (501 to 3000) g (3001 to 5000) g (5001 to 10 000) g (10 001 to 30 000) g (30 001 to 150 000) g	 5.8 µg 77 µg 86 µg 0.5 mg 1.4 mg 1.5 mg 1.5 mg 2.3 mg	NIST Handbook 44 verification with: ASTM E617 Class 1 weights ASTM E617 Class 2 weights
Pipettes ³	(0.5 to 1) µl (1.1 to 5) µl (5.1 to 10) µl (10.1 to 50) µl (50.1 to 100) µl (101 to 500) µl (501 to 1000) µl (1.1 to 10) ml	0.094 µl 0.11 µl 0.12 µl 0.17 µl 0.27 µl 0.91 µl 1.7 µl 17 µl	Gravimetric method using Class I analytical balance
Dispenser ³	25 ml 50 ml	38 µl 75 µl	Gravimetric method using Class I analytical balance
Force Gages ³ – Fixed Points	10 lb 50 lb 100 lb	0.04 lb 0.22 lb 0.37 lb	Dead weight method using NIST Class F weights.



Parameter/Equipment	Range	CMC ² (±)	Comments
Pressure Gages ³ – Pneumatic	(-12 to 100) psi (101 to 300) psi	0.08 psi 0.3 psi	Fluke 719 calibrator and 700 pressure module
Centrifuge ³ –			
Rotation	(6 to 15 000) rpm	4.4 rpm	Laser tachometer
Time interval	Up to 10 min (600 s)	0.17 s	Stop watch
Temperature	(-20 to 40) °C	1.2 °C	Fluke 724

III. Thermodynamic

Parameter/Equipment	Range	CMC ^{2,4} (±)	Comments
Thermometers and Temperature Indicating Systems	(-65 to 180) °C	0.58 °C	Environmental chamber by comparison to thermometer readout and PRT
	(-40 to 100) °C	0.013 °C	Silicon oil bath by comparison to thermometer readout and PRT
	(101 to 301) °C	0.017 °C	Silicon oil bath by comparison to thermometer readout and PRT
	(301 to 650) °C	0.02 °C	Dry block by comparison to thermometer readout and PRT
Thermometers and Temperature Indicating Systems ³	(-30 to 650) °C	0.02 °C + 0.6R	Dry block or direct comparison to thermometer readout and PRT

	Range	CMC ² (±)	Comments
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Parameter/Equipment			
Relative Humidity ³	(10 to 90) % RH	2.4 % RH	Environmental chamber or direct comparison to Vaisala humidity probe

¹ This laboratory offers commercial calibration service and field calibration service.

² Calibration and Measurement Capability Uncertainty (CMC) is the smallest uncertainty of measurement that a laboratory can achieve within its scope of accreditation when performing more or less routine calibrations of nearly ideal measurement standards or nearly ideal measuring equipment. CMCs represent expanded uncertainties expressed at approximately the 95 % level of confidence, usually using a coverage factor of $k = 2$. The actual measurement uncertainty of a specific calibration performed by the laboratory may be greater than the CMC due to the behavior of the customer's device and to influences from the circumstances of the specific calibration.

³ Field calibration service is available for this calibration and this laboratory meets A2LA R104 – *General Requirements: Accreditation of Field Testing and Field Calibration Laboratories* for these calibrations. Please note the actual measurement uncertainties achievable on a customer's site can normally be expected to be larger than the CMC found on the A2LA Scope. Allowance must be made for aspects such as the environment at the place of calibration and for other possible adverse effects such as those caused by transportation of the calibration equipment. The usual allowance for the actual uncertainty introduced by the item being calibrated, (e.g. resolution) must also be considered and this, on its own, could result in the actual measurement uncertainty achievable on a customer's site being larger than the CMC.

⁴ R is the Resolution of the unit under test/calibration.





Accredited Laboratory

A2LA has accredited

NORTHERN BALANCE AND SCALE, INC.

Bloomington, MN

for technical competence in the field of

Calibration

This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2005 *General requirements for the competence of testing and calibration laboratories*. This laboratory also meets the requirements of ANSI/NCSLI Z540-1-1994 and R205 – *Specific Requirements: Calibration Laboratory Accreditation Program*. This accreditation demonstrates technical competence for a defined scope and the operation of a laboratory quality management system (refer to joint ISO-ILAC-IAF Communiqué dated 8 January 2009).



Presented this 22nd day of November 2016.

A handwritten signature in black ink, written over a horizontal line.

President and CEO
For the Accreditation Council
Certificate Number 1684.01
Valid to August 31, 2018

For the calibrations to which this accreditation applies, please refer to the laboratory's Calibration Scope of Accreditation.