CERTIFICATE OF ACCREDITATION

The ANSI National Accreditation Board

Hereby attests that

Nationwide Gage Calibration, Inc.

135 East Saint Charles Road, Suite E
Carol Stream, IL 60188

Fulfills the requirements of

ISO/IEC 17025:2017

and national standard

ANSI/NCSL Z540-1-1994 (R2002)

In the field of

CALIBRATION

This certificate is valid only when accompanied by a current scope of accreditation document.
The current scope of accreditation can be verified at www.anab.org.

Jason Stine, Vice President

Expiry Date: 28 March 2027
Certificate Number: AC-1160

This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2017.
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 April 2017).

SCOPE OF ACCREDITATION TO ISO/IEC 17025:2017

AND

ANSI/NCSL Z540-1-1994 (R2002)

Nationwide Gage Calibration, Inc.

135 East Saint Charles Road, Suite E
Carol Stream, IL 60188
Richard Parish 630-529-4959

CALIBRATION

Valid to: **March 28, 2027** Certificate Number: **AC-1160**

Electrical – DC/Low Frequency

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
DC Voltage – Source	Up to 330 mV (0.33 to 3.3) V (3.3 to 33) V (33 to 330) V (330 to 1 020) V	7.8 µV 43 µV 0.47 mV 6.1 mV 22 mV	Comparison to Multi-Product Calibrator
DC Current – Source	Up to 330 µA (0.33 to 3.3) mA (3.3 to 33) mA (33 to 330) mA (0.33 to 1.1) A (1.1 to 3) A (3 to 11) A (11 to 20.5) A	0.1 µA 0.39 µA 3.9 µA 39 µA 0.24 mA 1.4 mA 6.4 mA 24 mA	Comparison to Fluke 5520A Multi-Product Calibrator
Resistance – Source	Up to 11 Ω (11 to 33) Ω (33 to 110) Ω (110 to 330) Ω (0.33 to 1.1) kΩ (1.1 to 3.3) kΩ (3.3 to 11) kΩ (11 to 33) kΩ (33 to 110) kΩ (110 to 330) kΩ (0.33 to 1.1) MΩ (1.1 to 3.3) MΩ	0.97 mΩ 1.5 mΩ 3.7 mΩ 14 mΩ 37 mΩ 0.11 Ω 0.37 Ω 1.1 Ω 3.7 Ω 13 Ω 38 Ω 0.24 kΩ	Comparison to Multi-Product Calibrator

Electrical – DC/Low Frequency

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Resistance – Source	(3.3 to 11) MΩ	1.7 kΩ	Comparison to Multi-Product Calibrator
	(11 to 33) MΩ	9.8 kΩ	
	(33 to 110) MΩ	65 kΩ	
	(110 to 330) MΩ	1.2 MΩ	
	(0.33 to 1.1) GΩ	2.4 MΩ	
AC Voltage – Source	(1 to 33) mV		Comparison to Multi-Product Calibrator
	(10 to 45) Hz	31 µV	
	45 Hz to 10 kHz	6.6 µV	
	(10 to 20) kHz	8.3 µV	
	(20 to 50) kHz	39 µV	
	(50 to 100) kHz	0.14 mV	
	(100 to 500) kHz	0.31 mV	
	(33 to 330) mV		
	(10 to 45) Hz	0.13 mV	
	45 Hz to 10 kHz	57 µV	
	(10 to 20) kHz	62 µV	
	(20 to 50) kHz	0.14 mV	
	(50 to 100) kHz	0.31 mV	
	(100 to 500) kHz	0.77 mV	
	(0.33 to 3.3) V		
	(10 to 45) Hz	1.2 mV	
	45 Hz to 10 kHz	0.58 mV	
	(10 to 20) kHz	0.73 mV	
	(20 to 50) kHz	1.2 mV	
	(50 to 100) kHz	2.7 mV	
	(100 to 500) kHz	9.2 mV	
	(3.3 to 33) V		
	(10 to 45) Hz	12 mV	
	45 Hz to 10 kHz	5.8 mV	
	(10 to 20) kHz	9.2 mV	
	(20 to 50) kHz	14 mV	
	(50 to 100) kHz	35 mV	
	(33 to 330) V		
	(10 to 45) Hz	74 mV	
	45 Hz to 10 kHz	78 mV	
	(10 to 20) kHz	97 mV	
	(20 to 50) kHz	0.12 V	
	(50 to 100) kHz	0.77 V	
	(330 to 1 020) V		
	45 Hz to 1 kHz	0.35 V	
	(1 to 5) kHz	0.3 V	
	(5 to 10) kHz	0.36 V	

Electrical – DC/Low Frequency

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
AC Current – Source	(29 to 330) µA		Comparison to Multi-Product Calibrator
	(10 to 20) Hz	1.2 µA	
	(20 to 45) Hz	0.99 µA	
	45 Hz to 1 kHz	0.94 µA	
	(1 to 5) kHz	1.4 uA	
	(5 to 10) kHz	3.2 uA	
	(10 to 30) kHz	6.2 uA	
	(0.33 to 3.3) mA		
	(10 to 20) Hz	7.8 uA	
	(20 to 45) Hz	4.9 uA	
	45 Hz to 1 kHz	4 uA	
	(1 to 5) kHz	7.7 uA	
	(5 to 10) kHz	20 uA	
	(10 to 30) kHz	39 uA	
	(3.3 to 33) mA		
	(10 to 20) Hz	70 µA	
	(20 to 45) Hz	36 µA	
	45 Hz to 1 kHz	18 µA	
	(1 to 5) kHz	32 µA	
	(5 to 10) kHz	78 µA	
	(10 to 30) kHz	0.16 mA	
	(33 to 330) mA		
	(10 to 20) Hz	0.69 mA	
	(20 to 45) Hz	0.35 mA	
	45 Hz to 1 kHz	0.16 mA	
	(1 to 5) kHz	0.39 mA	
	(5 to 10) kHz	0.77 mA	
	(10 to 30) kHz	1.6 mA	
	(0.33 to 1.1) A		
	(10 to 45) Hz	2.1 mA	
	45 Hz to 1 kHz	0.59 mA	
	(1 to 5) kHz	7 mA	
	(5 to 10) kHz	29 mA	

Electrical – DC/Low Frequency

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
AC Current – Source	(1.1 to 3) A (10 to 45) Hz 45 Hz to 1 kHz (1 to 5) kHz (5 to 10) kHz (3 to 11) A (45 to 100) Hz 100 Hz to 1 kHz (1 to 5) kHz (11 to 20.5) A (45 to 100) Hz 100 Hz to 1 kHz (1 to 5) kHz	 6.3 mA 2.3 mA 21 mA 87 mA 8.1 mA 13 mA 0.39 A 29 mA 35 mA 0.7 A	Comparison to Multi-Product Calibrator
Capacitance – Source	(190 to 400) pF (0.4 to 1.1) nF (1.1 to 3.3) nF (3.3 to 11) nF (11 to 33) nF (33 to 110) nF (110 to 330) nF (0.33 to 1.1) µF (1.1 to 3.3) µF (3.3 to 11) µF (11 to 33) µF (33 to 110) µF (110 to 330) µF (0.33 to 1.1) mF (1.1 to 3.3) mF (3.3 to 11) mF (11 to 33) mF (33 to 110) mF	6.3 pF 6.5 pF 20 pF 34 pF 0.13 nF 0.34 nF 1.3 nF 3.4 nF 13 nF 34 nF 0.21 µF 0.61 µF 2.3 µF 6.1 µF 18 µF 60 µF 0.19 mF 0.97 mF	Comparison to Multi-Product Calibrator
Electrical Simulation of Thermocouple Indicating Devices	Type B (600 to 800) °C (800 to 1 000) °C (1 000 to 1 550) °C (1 550 to 1 820) °C	 0.46 °C 0.37 °C 0.33 °C 0.36 °C	Comparison to Multi-Product Calibrator

Electrical – DC/Low Frequency

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Electrical Simulation of Thermocouple Indicating Devices	Type C		Comparison to Multi-Product Calibrator
	(0 to 150) °C	0.33 °C	
	(150 to 650) °C	0.29 °C	
	(650 to 1 000) °C	0.34 °C	
	(1 000 to 1 800) °C	0.52 °C	
	(1 800 to 2 316) °C	0.85 °C	
	Type E		
	(-250 to -100) °C	0.52 °C	
	(-100 to -25) °C	0.21 °C	
	(-25 to 350) °C	0.19 °C	
	(350 to 650) °C	0.21 °C	
	(650 to 1 000) °C	0.25 °C	
	Type J		
	(-210 to -100) °C	0.3 °C	
	(-100 to -30) °C	0.21 °C	
	(-30 to 150) °C	0.19 °C	
	(150 to 760) °C	0.21 °C	
	(760 to 1 200) °C	0.27 °C	
	Type K		
	(-200 to -100) °C	0.36 °C	
	(-100 to -25) °C	0.22 °C	
	(-25 to 120) °C	0.21 °C	
	(120 to 1 000) °C	0.29 °C	
	(1 000 to 1 372) °C	0.42 °C	
	Type L		
	(-200 to -100) °C	0.39 °C	
	(-100 to 800) °C	0.29 °C	
	(800 to 900) °C	0.21 °C	
	Type N		
	(-200 to -100) °C	0.42 °C	
	(-100 to -25) °C	0.26 °C	
	(-25 to 120) °C	0.23 °C	
	(120 to 410) °C	0.22 °C	
	(410 to 1 300) °C	0.3 °C	
	Type R		
	(0 to 250) °C	0.59 °C	
	(250 to 400) °C	0.38 °C	
	(400 to 1 000) °C	0.36 °C	
	(1 000 to 1 767) °C	0.42 °C	

Electrical – DC/Low Frequency

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Electrical Simulation of Thermocouple Indicating Devices	Type S (0 to 250) °C (250 to 1 000) °C (1 000 to 1 400) °C (1 400 to 1 767) °C Type T (-250 to -150) °C (-150 to 0) °C (0 to 120) °C (120 to 400) °C Type U (-200 to 0) °C (0 to 600) °C	 0.49 °C 0.38 °C 0.39 °C 0.48 °C 0.65 °C 0.27 °C 0.21 °C 0.19 °C 0.58 °C 0.3 °C	Comparison to Multi-Product Calibrator
Electrical Simulation of Thermocouple Indicators [1]	Type B (600 to 1 800) °C Type E (-200 to 950) °C Type J (-200 to 1 200) °C Type K (-200 to 1 370) °C Type L (-200 to 1 370) °C Type N (-200 to 1 370) °C Type R (-20 to 1 750) °C Type S (-20 to 1 750) °C Type T (-200 to 400) °C Type U (-200 to 400) °C	 2.6 °C 1.1 °C 1.3 °C 1.5 °C 1.1 °C 1.8 °C 3 °C 3 °C 1.5 °C 1.4 °C	Comparison to Precision Temperature Calibrator

Electrical – DC/Low Frequency

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Electrical Simulation of RTD Indicating Devices	Pt 385, 100 Ω		Comparison to Multi-Product Calibrator
	(-200 to -80) °C	0.12 °C	
	(-80 to 0) °C	0.12 °C	
	(0 to 100) °C	0.13 °C	
	(100 to 300) °C	0.14 °C	
	(300 to 400) °C	0.15 °C	
	(400 to 630) °C	0.16 °C	
	(630 to 800) °C	0.26 °C	
	Pt 3926, 100 Ω		
	(-200 to -80) °C	0.12 °C	
	(-80 to 0) °C	0.12 °C	
	(0 to 100) °C	0.13 °C	
	(100 to 300) °C	0.14 °C	
	(300 to 400) °C	0.15 °C	
	(400 to 630) °C	0.16 °C	
	Pt 3916, 100 Ω		
	(-200 to -190) °C	0.27 °C	
	(-190 to -80) °C	0.11 °C	
	(-80 to 0) °C	0.12 °C	
	(0 to 100) °C	0.12 °C	
	(100 to 260) °C	0.13 °C	
	(260 to 300) °C	0.13 °C	
	(300 to 400) °C	0.14 °C	
	(400 to 600) °C	0.15 °C	
	(600 to 630) °C	0.26 °C	
	Pt 385, 200 Ω		
	(-200 to -80) °C	0.11 °C	
	(-80 to 0) °C	0.11 °C	
	(0 to 100) °C	0.11 °C	
	(100 to 260) °C	0.12 °C	
	(260 to 300) °C	0.16 °C	
	(300 to 400) °C	0.17 °C	
	(400 to 600) °C	0.18 °C	
	(600 to 630) °C	0.19 °C	

Electrical – DC/Low Frequency

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Electrical Simulation of RTD Indicating Devices	Pt 385, 500 Ω		Comparison to Multi-Product Calibrator
	(-200 to -80) °C	0.11 °C	
	(-80 to 0) °C	0.12 °C	
	(0 to 100) °C	0.12 °C	
	(100 to 260) °C	0.12 °C	
	(260 to 300) °C	0.13 °C	
	(300 to 400) °C	0.13 °C	
	(400 to 600) °C	0.14 °C	
	(600 to 630) °C	0.15 °C	
	Pt 385, 1 000 Ω		
	(-200 to -80) °C	0.11 °C	
	(-80 to 0) °C	0.11 °C	
	(0 to 100) °C	0.11 °C	
	(100 to 260) °C	0.12 °C	
	(260 to 300) °C	0.12 °C	
	(300 to 400) °C	0.13 °C	
	(400 to 600) °C	0.13 °C	
	(600 to 630) °C	0.26 °C	
	Pt 385, 120 Ω (Ni 120)		
	(-80 to 0) °C	0.13 °C	
	(0 to 100) °C	0.13 °C	
	(100 to 260) °C	0.18 °C	
	Cu 427, 10 Ω		
	(-100 to 260) °C	0.32 °C	
Electrical Simulation of RTD Indicating devices [1]	Pt Ni 120 (100 Ω)		Comparison to Precision Temperature Calibrator
	(-80 to 260) °C	0.26 °C	
	Pt 385 (100 Ω)		
	(-200 to 800) °C	0.37 °C	
	Pt 392 (100 Ω)		
	(-200 to 630) °C	0.34 °C	
	Pt JIS (100 Ω)		
	(-200 to 360) °C	0.34 °C	
	Pt 385 (200 Ω)		
	(-200 to 250) °C	0.26 °C	
	(250 to 630) °C	0.82 °C	
	Pt 385 (500 Ω)		
	(-200 to 500) °C	0.34 °C	
	(500 to 630) °C	0.43 °C	
	Pt 385 (1 000 Ω)		
	(-200 to 100) °C	0.26 °C	
	(100 to 630) °C	0.26 °C	

Length – Dimensional Metrology

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Gage Blocks [2]	Up to 4 in (4 to 20) in	(1.2 + 3.7*L*) µin (0.27 + 1.8*L*) µin	Mechanical Comparison using a Gage Block Comparator and Master Gage Blocks
Gage Block Comparator	Up to 20 in	1.1 µin	Comparison to Master Gage Blocks
Pin Gages [1]	Up to 2 in	28 µin	Non-contact Comparison using a Laser Micrometer and Master Plug Gages
Plain Plug Gages [1,2]	Up to 10 in (10 to 36) in	(15 + 1.2*L*) µin (18 + 1.3*L*) µin	Comparison to Bench Micrometer, Gage Blocks
Plain Ring Gages [2]	(0.040 to 12) in	(15 + 1.8*L*) µin	Comparison to I.D. Comparator, Gage Blocks
Thread Measuring Wires	Up to 0.5 in	17 µin	Comparison to Bench Micrometer, Gage Blocks, Master Plug Gage
Thread Plug Gages [1] Major Diameter Pitch Diameter	Up to 10 in	64 µin	Comparison to Bench Micrometer, Thread Wires, Gage Blocks
Thread Plug Gages Tapered Pitch Diameter	Up to 10 in	72 µin	Comparison to Bench Micrometer, Thread Wires, Gage Blocks
Thread Ring Gages [1]	Up to 10 in	72 µin	Comparison to Thread Set Plugs
End Rod Standards [1,2]	Up to 60 in	(14 + 2.4*L*) µin	Comparison to Precision Measuring Machine, Gage Blocks
Calipers [1,2]	Up to 40 in 40 to 72 in	(300 + 0.16*L*) µin (290 +0.4*L*) µin	Comparisons to Caliper Master, Gage Blocks, Surface Plate
Caliper Master [1,2]	Up to 12 in (12 to 40) in	68.4 µin (43 + 1.8*L*) µin	Comparisons to Gage Blocks, Precision Indicator, Surface Plate

Length – Dimensional Metrology

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Height Gages [1,2]	Up to 40 in	(91 + 0.5*L*) µin	Comparison to Gage Blocks, Precision Indicator, Surface Plate
Indicators [1]	Up to 6 in	42 µin	Comparison to Bench Micrometer, Gage Blocks
LVDTs [1]	Up to 0.05 in	16 µin	Comparison to Bench Micrometer, Gage Blocks
Depth Micrometers [1]	Up to 12 in	56 µin	Comparison to Gage Blocks, Surface Plate
Outside Micrometers [1,2]	Up to 24 in (24 to 78) in	(27 + 1.8*L*) µin (580 + 0.2*L*) uin	Comparison to Gage Blocks, Optical Flat
Inside Micrometers [1,2]	Up to 40 in (Rod Length)	(56 + 0.8*L*) µin	Comparison to Precision Measuring Machine, Gage Blocks
Laser Micrometers [1]	Up to 2 in	18 µin	Comparison to Precision Master Plain Plugs
Supermicrometers / Bench Micrometers [1,3]	Up to 1 in Travel Up to 2 in Travel	7.1 µin 7.5 µin	Comparison to Gage Blocks
ID/OD Comparator [1,2] (Comparative)	Up to 12 in	(3.5 + 1.3*L*) µin	Comparison to Gage Blocks
Radius Gages	Up to 1 in	220 µin	Direct Measure using Precision Vision System
Scales / Rules / Tapes [2]	Up to 12 ft	(160 + 0.71*L*) µin	Direct Measure using Precision Vision System

Length – Dimensional Metrology

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Surface Plates [1,2]			In accordance with ASME B89.3.7 using Laser Optics System
Overall Flatness	Up to (120 X 120) in	(64 + 0.53*DL*) µin	
Local Area Flatness	Up to (24 x 24) in	42 µin	Mahr Indicator Repeat-o-Meter, Precision Indicator
(Repeat Reading)	Up to (120 x 120) in	36 µin	
Optical Comparators [1]			Comparisons to Precision Balls, Glass Scales, Gage Blocks
Angle	Up to 360°	0.04º	
Magnification	(5 to 100) X	470 µin	
Radius	Up to 12 in	140 µin	
Squareness of Table	Up to 12 in	160 µin	
X-Y Axis Linearity	Up to 12 in	150 µin	
Vision Systems [1]			Comparison to Precision Balls, Glass Scales, Gage Blocks
Angle	Up to 12 in	0.021º	
Radius	Up to 12 in	61 µin	
Squareness of Table	Up to 12 in	39 µin	
X-Y Axis Linearity	Up to 12 in	63 µin	

Mass and Mass-Related

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Torque Tools [1,2]	Up to 50 ozf·in	0.5 ozf·in	Comparison to Torque Tester
	Up to 1 000 lbf·in	(0.2 + 0.004 1*X*) lbf·in	
	Up to 1 000 lbf·ft	(0.3 + 0.003 1*X*) lbf·ft	
	Up to 2 000 lbf·ft	22 lbf·ft	
Torque Transducers [1]	(5 to 50) ozf·in	0.062 ozf·in	Comparison to Master Weights, Torque Arms
	(4 to 50) lbf·in	0.062 lbf·in	
	(30 to 400) lbf·in	0.5 lbf·in	
	(80 to 1 000) lbf·in	1.3 lbf·in	
	(20 to 250) lbf·ft	0.31 lbf·ft	
	(60 to 600) lbf·ft	0.74 lbf·ft	
	(100 to 1 000) lbf·ft	1.3 lbf·ft	
	(200 to 2 000) lbf·ft	2.5 lbf·ft	

Mass and Mass-Related

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Torque Arms	Up to 2.5 in (2.5 to 5) in (5 to 10) in (10 to 20) in	59 µin 88 µin 160 µin 300 µin	Comparison to Gage Blocks, Master Plugs, Bench Micrometer
Durometer Calibrators (A, B, O, C, D, DO)	(0.55 to 45.45) N	0.016 N	Comparison to Force Gage, Load Cell
Durometers (Types A, B, C, D, DO, O) Spring Force Indenter Dimensions Shape Length	 (0.55 to 8.05) N Up to 45.45 N (30 to 35)° (0.096 to 0.1) in	 0.9 Duro Points 0.9 Duro Points 0.03° 66 µin	Direct verification per internal cal procedure using Durometer Calibrator Vision system
Rockwell Hardness Testers [1]	HRBW Low Medium High HRC Low Medium High	 0.8 HRBW 0.81 HRBW 0.85 HRBW 0.86 HRC 0.83 HRC 0.82 HRC	Indirect Verification per ASTM E18 using Hardness Test Blocks.
Rockwell Superficial Hardness Testers [1]	HR15N HR30N HR45N HR15TW HR30TW HR45TW	0.94 HR15N 0.91 HR30N 0.97 HR45N 0.93 HRTW 0.92 HRTW 0.94 HRTW	Indirect Verification per ASTM E18 using Hardness Test Blocks.
Microhardness Testers [1]	Repeatability under forces P (gf) 500 ≤ P ≥ 1 000 557 < HK > 685 Error 571< HV >790 Error	 1.3 µm 0.08 µm 2.9 µm 0.9 µm	Indirect Verification per ASTM E92 using Hardness Test Blocks.
Force Gages [1,2]	Up to 500 lbf Up to 1 000 lbf	(0.02 + 0.002*X*) lbf (0.12 + 0.004*X*) lbf	Comparison to Class F Weights, Force Tester

Mass and Mass-Related

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Cable Tensiometers [2]	Up to 1 000 lbf	(0.34 + 0.007 5*X*) lbf	Comparison to Force Tester
Pressure Gages, Pressure Transducers [1]	Up to 5 psig Up to 200 psig Up to 1 000 psig Up to 3 000 psig Up to 7 000 psig Up to 10 000 psig	0.002 4 psi 0.14 psi 0.53 psi 0.67 psi 8.5 psi 16 psi	Comparison to Master Pressure Gages
Vacuum Devices	Up to 30 inHg	0.12 inHg	Comparison to Vacuum Test Gage
Scales and Balances [1,4]	Up to 120 g (120 to 220) g	93 µg 0.83 mg	ASTM E617 Class 0 Weights and internal calibration procedure utilized in the calibration of the weighing system.
Scales and Balances [1,4]	(220 to 510) g	1.2 mg	ASTM E617 Class 4 Weights and internal calibration procedure utilized in the calibration of the weighing system.
Scales and Balances [1,4]	(510 to 3 000) g	13 mg	ASTM E617 Class 1 Weights and internal calibration procedure utilized in the calibration of the weighing system.
Scales and Balances [1,2,4]	Up to 1 000 lb	(0.26 + 0.001 7*X*) lb	NIST Class F Weights and internal calibration procedure utilized in the calibration of the weighing system.

Thermodynamic

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Temperature Thermometers [1]	(35 to 100) °C (100 to 250) °C (250 to 375) °C	0.32 °C 0.49 °C 0.67 °C	Direct Measure using Thermal Dry Well
Temperature Thermometers [1]	(-200 to 1 200) °C	1.3 °C	Comparison to Precision Temperature Calibrator w/ Type J Thermocouple Probe

Time and Frequency

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Stopwatch /Timers	Up to 24 hr	490 ms	Comparison to N.I.S.T. Time Signal
Frequency – Source	Up to 100 Hz 100 Hz to 1 kHz (1 to 100) kHz (100 to 500) kHz	0.33 mHz 2.9 mHz 0.29 Hz 1.5 Hz	Comparison to Multi-Product Calibrator

Calibration and Measurement Capability (CMC) is expressed in terms of the measurement parameter, measurement range, expanded uncertainty of measurement and reference standard, method, and/or equipment. The expanded uncertainty of measurement is expressed as the standard uncertainty of the measurement multiplied by a coverage factor of 2 (k=2), corresponding to a confidence level of approximately 95%.

Notes:

1. On-site calibration service is available for this parameter, since on-site conditions are typically more variable than those in the laboratory, larger measurement uncertainties are expected on-site than what is reported on the accredited scope.
2. DL = diagonal length in inches; L = length in inches; X = value of applied mass, force, or torque.
3. Uncertainty based on measurement over 1-inch lead screw.
4. The CMC for scales and balances is highly dependent upon the resolution of the unit under test. The CMC presented here does not include the resolution of the unit under test. The resolution will be included in the reported measurement uncertainty at the time of calibration. Calibration weighing system calibrated in accordance with internal calibration procedure CAL-SB290.
5. Unless otherwise specified in the far-right hand column, the calibration procedure being utilized by the laboratory was written internally.
6. This scope is formatted as part of a single document including Certificate of Accreditation No. AC-1160.

Jason Stine, Vice President