SCOPE OF ACCREDITATION TO ISO/IEC 17025:2005

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CALIBRATION

Valid To: May 31, 2020 Certificate Number: 3708.01

In recognition of the successful completion of the A2LA evaluation process, accreditation is granted to this laboratory to perform the following calibrations[1]:

I. Dimensional

Parameter/Equipment	Range	CMC[2, 4] (±)	Comments
Indicators, Digital	Up to 1 in	60 µin	Gage block
Calipers	Up to 16 in (>16 to 40) in Up to 500 mm (>500 to 1000) mm	430 µin (1.3*L* + 410) µin (0.0006*L* + 8.5) µm (0.0019*L* + 7.9) µm	Gage block
Micrometers	Up to 8 in (>8 to 40) in Up to 200 mm (>200 to 1000) mm	(2.3*L* + 34) µin (4.3*L* + 15) µin (0.0025*L* + 0.7) µm (0.0043*L* + 0.3) µm	Gage block
Height Gage	Up to 12 in (>12 to 40) in Up to 300 mm (>300 to 1000) mm	200 µin (2.4*L* + 170) µin (0.0008*L* + 3.5) µm (0.0029*L* + 2.7) µm	Gage block
Gage Block	Up to 1 in (>1 to 20) in	(2.3x + 2) µin (3.7x + 1) µin	Comparison with Gage block Grade 0

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Parameter/Equipment	Range	CMC[2] (±)	Comments
Plug Gage, Pin Gage	Up to 1 in (>1 to 16) in	(2.7x + 8) µin (3.7x + 6) µin	Universal length machine
Plain Ring Gage	Up to 1 in (>1 to 16) in	(2.7x + 8) µin (3.7x + 6) µin	Universal length machine
60º Thread Plug – Pitch Diameter Major Diameter	 Up to 1 in (>1 to 16) in Up to 1 in (>1 to 16) in	 85 µin (2.0x + 77) µin (2.7x + 8) µin (3.7x + 6) µin	Universal length machine and thread measuring wire

II. Electrical – DC/Low Frequency

Parameter/Equipment	Range	CMC[2, 5] (±)	Comments
DC Voltage – Generate[3]	(0 to 330) mV (0.33 to 3.3) V (3.3 to 33) V (33 to 330) V (330 to 1000) V	0.0020 % + 1.0 µV 0.0011 % + 2.0 µV 0.0012 % + 20 µV 0.0018 % + 150 µV 0.0018 % + 1.5 mV	Multi-function calibrator
DC Voltage – Measure[3]	(0 to 200) mV (0.2 to 2) V (2 to 20) V (20 to 200) V (200 to 1000) V	0.0006 % + 120 nV 0.0004 % + 500 nV 0.0004 % + 5 µV 0.0006 % + 50 µV 0.0006 % + 1.2 mV	Reference multimeter
DC High Voltage – Measure[3]	(1 to 100) kV	0.06 % + 0.50 V	High accuracy voltage divider

Parameter/Equipment	Range	CMC[2, 5] (±)	Comments
DC Current – Generate[3]	(0 to 330) µA (0.3 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) A (10 to 16.5) A (16.5 to 150) A (150 to 1025) A	0.015 % + 20 nA 0.01 % + 50 nA 0.01 % + 250 nA 0.01 % + 2.5 µA 0.02 % + 40 µA 0.038 % + 40 µA 0.05 % + 500 µA 0.10 % + 750 µA 0.50 % + 20 mA 0.50 % + 140 mA 0.50 % + 500 mA	Multi-function calibrator Multi-function calibrator & 50 turn coil
DC Current – Measure[3]	(0 to 200) µA (0.2 to 2) mA (2 to 20) mA (20 to 200) mA (0.2 to 2) A (2 to 20) A	0.0015 % + 0.40 nA 0.0015 % + 4.0 nA 0.0016 % + 40 nA 0.0045 % + 0.80 µA 0.021 % + 16 µA 0.046 % + 0.40 mA	Reference Multimeter
DC Power – Generate[3] (0.033 to 1020) V	(0.33 to 330) mA (0.33 to 3) A (3 to 20.5) A	0.042 % of output 0.055 % of output 0.10 % of output	Multi-function calibrator

Parameter/Range	Frequency	CMC[2, 5] (±)	Comments
AC Voltage – Generate[3]			
(1 to 33) mV	(10 to 45) Hz (0.045 to 10) kHz (10 to 20) kHz (20 to 50) kHz (50 to 100) kHz (100 to 500) kHz	0.080 % + 6 µV 0.015 % + 6 µV 0.020 % + 6 µV 0.10 % + 6 µV 0.35 % + 12 µV 0.80 % + 50 µV	Multi-function calibrator
(33 to 330) mV	(10 to 45) Hz (0.045 to 10) kHz (10 to 20) kHz (20 to 50) kHz (50 to 100) kHz (100 to 500) kHz	0.030 % + 8 µV 0.015 % + 8 µV 0.016 % + 8 µV 0.035 % + 8 µV 0.080 % + 32 µV 0.20 % + 70 µV	
(0.33 to 3.3) V	(10 to 45) Hz (0.045 to 10) kHz (10 to 20) kHz (20 to 50) kHz (50 to 100) kHz (100 to 500) kHz	0.030 % + 50 µV 0.015 % + 60 µV 0.019 % + 60 µV 0.030 % + 50 µV 0.070 % + 125 µV 0.24 % + 600 µV	
(3.3 to 33) V	(10 to 45) Hz (0.045 to 10) kHz (10 to 20) kHz (20 to 50) kHz (50 to 100) kHz	0.030 % + 650 µV 0.015 % + 600 µV 0.024 % + 600 µV 0.035 % + 600 µV 0.090 % + 1.6 mV	
(33 to 330) V	(0.045 to 1) kHz (1 to 10) kHz (10 to 20) kHz (20 to 50) kHz (50 to 100) kHz	0.019 % + 2 mV 0.020 % + 6 mV 0.025 % + 6 mV 0.030 % + 6 mV 0.20 % + 50 mV	
(330 to 1020) V	(0.045 to 1) kHz (1 to 5) kHz (5 to 10) kHz	0.030 % + 10 mV 0.025 % + 10 mV 0.030 % + 10 mV	

Parameter/Range	Frequency	CMC[2, 5] (±)	Comments
AC Voltage – Measure[3]			
(0 to 200) mV	(1 to 10) Hz (10 to 40) Hz (40 to 100) Hz (0.1 to 2) kHz (2 to 10) kHz (10 to 30) kHz (30 to 100) kHz	0.020 % + 16 µV 0.015 % + 5 µV 0.013 % + 5 µV 0.013 % + 2.4 µV 0.013 % + 5 µV 0.035 % + 10 µV 0.076 % + 24 µV	Reference Multimeter
(0.2 to 2) V	(1 to 10) Hz (10 to 40) Hz (40 to 100) Hz (0.1 to 2) kHz (2 to 10) kHz (10 to 30) kHz (30 to 100) kHz (100 to 300) kHz (0.3 to 1) MHz	0.018 % + 140 µV 0.012 % + 24 µV 0.0095 % + 24 µV 0.0075 % + 24 µV 0.0095 % + 24 µV 0.025 % + 50 µV 0.056 % + 240 µV 0.30 % + 2.4 mV 1.0 % + 24 mV	
(2 to 20) V	(1 to 10) Hz (10 to 40) Hz (40 to 100) Hz (0.1 to 2) kHz (2 to 10) kHz (10 to 30) kHz (30 to 100) kHz (100 to 300) kHz (0.3 to 1) MHz	0.018 % + 1.4 mV 0.012 % + 240 µV 0.0095 % + 240 µV 0.0075 % + 240 µV 0.0095 % + 240 µV 0.025 % + 500 µV 0.056 % + 2.4 mV 0.30 % + 24 mV 1.0 % + 240 mV	
(20 to 200) V	(1 to 10) Hz (10 to 40) Hz (40 to 100) Hz (0.1 to 2) kHz (2 to 10) kHz (10 to 30) kHz (30 to 100) kHz (100 to 300) kHz (0.3 to 1) MHz	0.018 % + 14 mV 0.012 % + 2.4 mV 0.01 % + 2.4 mV 0.008 % + 2.4 mV 0.01 % + 2.4 mV 0.025 % + 5.0 mV 0.056 % + 24 mV 0.30 % + 240 mV 1.0 % + 2.4 V	
(200 to 1050) V	(1 to 10) Hz (10 to 40) Hz (0.040 to 10) kHz (10 to 30) kHz (30 to 100) kHz	0.018 % + 160 mV 0.014 % + 50 mV 0.011 % + 50 mV 0.025 % + 100 mV 0.062 % + 500 mV	

Parameter/Range	Frequency	CMC[2, 4, 5] (±)	Comments
AC High Voltage – Measure[3]			
(1 to 50) kV	60 Hz	0.60 % + 0.80 V	High accuracy voltage divider
AC Current – Generate[3]			
(29 to 330) µA	(10 to 20) Hz (20 to 45) Hz (0.045 to 1) kHz (1 to 5) kHz (5 to 10) kHz (10 to 30) kHz	0.20 % + 100 nA 0.15 % + 100 nA 0.13 % + 100 nA 0.30 % + 150 nA 0.80 % + 200 nA 1.6 % + 400 nA	Multi-function calibrator
(0.33 to 3.3) mA	(10 to 20) Hz (20 to 45) Hz (0.045 to 1) kHz (1 to 5) kHz (5 to 10) kHz (10 to 30) kHz	0.20 % + 150 nA 0.13 % + 150 nA 0.10 % + 150 nA 0.20 % + 200 nA 0.50 % + 300 nA 1.0 % + 600 nA	
(3.3 to 33) mA	(10 to 20) Hz (20 to 45) Hz (0.045 to 1) kHz (1 to 5) kHz (5 to 10) kHz (10 to 30) kHz	0.18 % + 2 µA 0.09 % + 2 µA 0.04 % + 2 µA 0.08 % + 2 µA 0.20 % + 3 µA 0.40 % + 4 µA	
(33 to 330) mA	(10 to 20) Hz (20 to 45) Hz (0.045 to 1) kHz (1 to 5) kHz (5 to 10) kHz (10 to 30) kHz	0.18 % + 20 µA 0.09 % + 20 µA 0.04 % + 20 µA 0.10 % + 50 µA 0.20 % + 100 µA 0.40 % + 200 µA	
(0.33 to 1.1) A	(10 to 45) Hz (0.045 to 1) kHz (1 to 5) kHz (5 to 10) kHz	0.18 % + 100 µA 0.05 % + 100 µA 0.60 % + 1 mA 2.5 % + 5 mA	
(1.1 to 3) A	(10 to 45) Hz (0.045 to 1) kHz (1 to 5) kHz (5 to 10) kHz	0.18 % + 100 µA 0.06 % + 100 µA 0.60 % + 1 mA 2.5 % + 5 mA	

Parameter/Range	Frequency	CMC[2, 5] (±)	Comments
AC Current – Generate[3] (cont)			Multi-function calibrator
(3 to 11) A	(45 to 100) Hz (0.1 to 1) kHz (1 to 5) kHz	0.06 % + 2 mA 0.10 % + 2 mA 3.0 % + 2 mA	
(11 to 20) A	(45 to 100) Hz (0.1 to 1) kHz (1 to 5) kHz	0.12 % + 5 mA 0.15 % + 5 mA 3.0 % + 5 mA	
Toroidal Clamp			
(10 to 16.5) A	(45 to 65) Hz (65 to 440) Hz	0.28 % + 3.0 mA 0.79 % + 3.0 mA	Multi-function calibrator & 50 turn coil
(16.5 to 150) A	(45 to 65) Hz (65 to 440) Hz	0.28 % + 25 mA 0.79 % + 27 mA	
(150 to 1025) A	(45 to 65) Hz (65 to 440) Hz	0.28 % + 90 mA 0.79 % + 100 mA	
Non-Toroidal Clamp			
(10 to 16.5) A	(45 to 65) Hz (65 to 440) Hz	0.56 % + 30 mA 1.0 % + 30 mA	
(16.5 to 150) A	(45 to 65) Hz (65 to 440) Hz	0.56 % + 250 mA 1.0 % + 250 mA	
(150 to 1025) A	(45 to 65) Hz (65 to 440) Hz	0.56 % + 900 mA 1.0 % + 900 mA	

Parameter/Range	Frequency	CMC[2, 5] (±)	Comments
AC Current – Measure[3]			
(0 to 200) µA	1 Hz to 10 kHz (10 to 30) kHz (30 to 100) kHz	0.059 % + 24 nA 0.078 % + 24 nA 0.40 % + 24 nA	Reference Multimeter
(0.2 to 2) mA	(1 to 10) Hz (0.01 to 10) kHz (10 to 30) kHz (30 to 100) kHz	0.038 % + 0.24 µA 0.034 % + 0.24 µA 0.078 % + 0.24 µA 0.40 % + 0.24 µA	
(2 to 20) mA	(1 to 10) Hz (0.01 to 10) kHz (10 to 30) kHz (30 to 100) kHz	0.038 % + 2.4 µA 0.034 % + 2.4 µA 0.078 % + 2.4 µA 0.40 % + 2.4 µA	
(20 to 200) mA	(0.001 to 2) kHz (2 to 10) kHz (10 to 30) kHz	0.038 % + 24 µA 0.031 % + 24 µA 0.070 % + 24 µA	
(0.2 to 2) A	(0.01 to 2) kHz (2 to 10) kHz (10 to 30) kHz	0.071 % + 240 µA 0.082 % + 240 µA 0.30 % + 240 µA	
(2 to 20) A	(0.01 to 2) kHz (2 to 10) kHz	0.09 % + 2.4 mA 0.25 % + 2.4 mA	
AC Power – Generate[3]			
(33 to 329.99) mV (45 to 65) Hz	(0.0033 to 2.2) A (2.2 to 4.5) A (4.5 to 20.5) A	0.07 % of output 0.11 % of output 0.15 % of output	Multi-function calibrator
(0.33 to 1020) V (45 to 65) Hz	(0.0033 to 2.2) A (2.2 to 4.5) A (4.5 to 20.5) A	0.08 % of output 0.12 % of output 0.15 % of output	

Parameter/Equipment	Range	CMC[2, 5] (±)	Comments
Resistance – Generate[3]	(0 to 11) Ω (11 to 33) Ω (33 to 110) Ω (0.11 to 1.1) kΩ (1.1 to 11) kΩ (11 to 110) kΩ (0.11 to 1.1) MΩ (1.1 to 3.3) MΩ (3.3 to 11) MΩ (11 to 33) MΩ (33 to 110) MΩ (110 to 330) MΩ (0.33 to 1.1) GΩ	0.004 % + 1 mΩ 0.003 % + 1.5 mΩ 0.0028 % + 1.4 mΩ 0.0028 % + 2 mΩ 0.0028 % + 20 mΩ 0.0028 % + 200 mΩ 0.0032 % + 2 Ω 0.006 % + 30 Ω 0.013 % + 50 Ω 0.025 % + 2.5 kΩ 0.05 % + 3 kΩ 0.30 % + 100 kΩ 1.5 % + 500 kΩ	Multi-function calibrator
Resistance – Measure[3]	(0 to 2) Ω (2 to 20) Ω (20 to 200) Ω (0.2 to 2) kΩ (2 to 20) kΩ (20 to 200) kΩ (0.2 to 2) MΩ (2 to 20) MΩ (20 to 200) MΩ (0.2 to 2) GΩ (2 to 20) GΩ	0.0019 % + 5 µΩ 0.0012 % + 18 µΩ 0.001 % + 60 µΩ 0.001 % + 600 µΩ 0.001 % + 6 mΩ 0.001 % + 60 mΩ 0.0011 % + 1.2 Ω 0.002 % + 120 Ω 0.0075 % + 12 kΩ 0.068 % + 1.2 MΩ 0.068 % + 12 MΩ	Reference Multimeter
Capacitance – Generate[3]	(0.22 to 3.3) nF (3.3 to 11) nF (11 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	0.50 % + 10 pF 0.25 % + 10 pF 0.25 % + 0.1 nF 0.25 % + 0.3 nF 0.25 % + 1 nF 0.25 % + 3 nF 0.25 % + 10 nF 0.40 % + 30 nF 0.45 % + 100 nF 0.45 % + 300 nF 0.45 % + 1 µF 0.45 % + 3 µF 0.45 % + 10 µF 0.75 % + 30 µF 1.1 % + 100 µF	Multi-function calibrator

Parameter/Range	Frequency	CMC[2, 4] (±)	Comments
Capacitance – Measure[3]			
(0.5 to 50) µF	(20 to 100) Hz	0.13 %	Precision LCR meter
(0.005 to 10) µF	(0.1 to 1) kHz	0.08 %	
(0.0025 to 2.5) µF	(1 to 10) kHz	0.08 %	
(2.5 to 500) nF	(10 to 100) kHz	0.08 %	
(0.25 to 75) nF	(0.1 to 1) MHz	0.08 %	
Inductance – Measure[3]			
(0.5 to 100) H	(20 to 100) Hz	0.13 %	Precision LCR meter
(0.005 to 50) H	(0.1 to 1) kHz	0.08 %	
(0.0005 to 5) H	(1 to 10) kHz	0.08 %	
(0.0005 to 1) H	(10 to 100) kHz	0.08 %	
(0.005 to 10) mH	(0.1 to 1) MHz	0.08 %	

Parameter/Equipment	Range	CMC[2] (±)	Comments
Electrical Simulation of Thermocouple and Thermocouple Indicating Devices – Measure & Generate[3] –			
Type B	(600 to 800) ºC	0.44 ºC	Multi-function calibrator
	(800 to 1000) ºC	0.34 ºC	
	(1000 to 1550) ºC	0.30 ºC	
	(1550 to 1820) ºC	0.33 ºC	
Type C	(0 to 150) ºC	0.30 ºC	
	(150 to 650) ºC	0.26 ºC	
	(650 to 1000) ºC	0.31 ºC	
	(1000 to 1800) ºC	0.50 ºC	
	(1800 to 2316) ºC	0.84 ºC	
Type E	(-250 to -100) ºC	0.50 ºC	
	(-100 to -25) ºC	0.16 ºC	
	(-25 to 350) ºC	0.14 ºC	
	(250 to 650) ºC	0.16 ºC	
	(650 to 1000) ºC	0.21 ºC	

Parameter/Equipment	Range	CMC[2] (±)	Comments
Electrical Simulation of Thermocouple and Thermocouple Indicating Devices – Measure & Generate[3] (cont)			
Type J	(-210 to -100) ºC (-100 to -30) ºC (-30 to 150) ºC (150 to 760) ºC (760 to 1200) ºC	0.27 ºC 0.16 ºC 0.14 ºC 0.17 ºC 0.23 ºC	Multi-function calibrator
Type K	(-200 to -100) ºC (-100 to -25) ºC (-25 to 120) ºC (120 to 1000) ºC (1000 to 1372) ºC	0.33 ºC 0.18 ºC 0.16 ºC 0.26 ºC 0.40 ºC	
Type N	(-200 to -100) ºC (-100 to -25) ºC (-25 to 120) ºC (120 to 410) ºC (410 to 1300) ºC	0.40 ºC 0.22 ºC 0.19 ºC 0.18 ºC 0.27 ºC	
Type R	(0 to 250) ºC (250 to 400) ºC (400 to 1000) ºC	0.57 ºC 0.35 ºC 0.33 ºC	
Type S	(1000 to 1767) ºC	0.40 ºC	
	(0 to 250) ºC (250 to 1000) ºC (1000 to 1400) ºC	0.47 ºC 0.36 ºC 0.37 ºC	
Type T	(1000 to 1767) ºC	0.46 ºC	
	(-250 to -150) ºC (-150 to 0) ºC (0 to 120) ºC	0.63 ºC 0.24 ºC 0.16 ºC	
Type U	(120 to 400) ºC	0.14 ºC	
	(-200 to 0) ºC (0 to 600) ºC	0.56 ºC 0.27 ºC	

Parameter/Equipment	Range	CMC[2] (±)	Comments
Electrical Simulation of RTD Indicating Devices – Generate[3]			
Pt 385, 100 Ω			
	(-200 to 0) ºC	0.05 ºC	Multi-function calibrator
	(0 to 100) ºC	0.07 ºC	
	(100 to 300) ºC	0.09 ºC	
	(300 to 400) ºC	0.10 ºC	
	(400 to 630) ºC	0.12 ºC	
	(630 to 800) ºC	0.23 ºC	
Pt 3926, 100 Ω			
	(-200 to 0) ºC	0.05 ºC	
	(0 to 100) ºC	0.07 ºC	
	(100 to 300) ºC	0.09 ºC	
	(300 to 400) ºC	0.10 ºC	
	(400 to 630) ºC	0.12 ºC	
Pt 3916, 100 Ω			
	(-200 to -190) ºC	0.25 ºC	
	(-190 to -80) ºC	0.04 ºC	
	(-80 to 0) ºC	0.05 ºC	
	(0 to 100) ºC	0.06 ºC	
	(100 to 260) ºC	0.07 ºC	
	(260 to 300) ºC	0.08 ºC	
	(300 to 400) ºC	0.09 ºC	
	(400 to 600) ºC	0.10 ºC	
	(600 to 630) ºC	0.23 ºC	
Pt 385, 200 Ω			
	(-200 to 100) ºC	0.04 ºC	
	(100 to 260) ºC	0.05 ºC	
	(260 to 300) ºC	0.12 ºC	
	(300 to 400) ºC	0.13 ºC	
	(400 to 600) ºC	0.14 ºC	
	(600 to 630) ºC	0.16 ºC	
Pt 385, 500 Ω			
	(-200 to -80) ºC	0.04 ºC	
	(-80 to 100) ºC	0.05 ºC	
	(100 to 260) ºC	0.06 ºC	
	(260 to 400) ºC	0.08 ºC	
	(400 to 600) ºC	0.09 ºC	
	(600 to 630) ºC	0.11 ºC	
Pt 385, 1000 Ω			
	(-200 to 0) ºC	0.03 ºC	
	(0 to 100) ºC	0.04 ºC	
	(100 to 260) ºC	0.05 ºC	
	(260 to 300) ºC	0.06 ºC	
	(300 to 600) ºC	0.07 ºC	
	(600 to 630) ºC	0.23 ºC	

Parameter/Equipment	Range	CMC[2, 4] (±)	Comments
Electrical Simulation of RTD Indicating Devices – Generate[3] (cont)			
PtNi 385, 120 Ω	(-80 to 100) ºC (100 to 260) ºC	0.08 ºC 0.14 ºC	Multi-function calibrator
Cu 427, 10 Ω	(-100 to 260) ºC	0.30 ºC	
Oscilloscope[3] –			
Amplitude Voltage Square Wave			
(0.01 to 10) kHz			
Into 50 Ω Into 1 MΩ	(0.001 to 6.6) V_{pp} (0.001 to 130) V_{pp}	0.25 % + 40 µV 0.10 % + 40 µV	Multi-function calibrator
Leveled Sine Wave Amplitude Reference			
(0.05 to 10) MHz	(0.005 to 5.5) V_{pp}	2.0 % of Output + 300 µV	
Amplitude Flatness Relative to 50 kHz			
(0.05 to 100) MHz	(0.005 to 5.5) V_{pp}	1.5 % of Output + 100 µV	
(100 to 300) MHz	(0.005 to 5.5) V_{pp}	2.0 % of Output + 100 µV	
(300 to 600) MHz	(0.005 to 5.5) V_{pp}	4.0 % of Output + 100 µV	
(600 to 1100) MHz	(0.005 to 5.5) V_{pp}	5.0 % of Output + 100 µV	
Level Sine Wave Frequency	(0.05 to 1100) MHz	0.00025 %	
Leading Edge Risetime	≤ 300 ps	+0 ps / -100 ps	
Time Markers	1 ns to 20 ms 50 ms 0.1 s 0.2 s 0.5 s 1 s 2 s 5 s	0.00025 % 0.0075 % 0.013 % 0.023 % 0.053 % 0.10 % 0.20 % 0.50 %	

III. Fluid Quantities

Parameter/Equipment	Range	CMC[2] (±)	Comments
Mass Flow Meters[3] –	Up to 50 slpm (50 to 150) slpm (150 to 500) slpm	0.0048x + 0.14 slpm 0.0044x + 0.8 slpm 0.0046x + 1.5 slpm	Portable calibration unit

IV. Mechanical

Parameter/Equipment	Range	CMC[2] (±)	Comments
Pressure[3]	(0 to 10) H_2O (0 to <8) psia (8 to 17) psia (>17 to 30) psia (-1 to 5) psi (>5 to 30) psi (>30 to 100) psi (>100 to 400) psi (>400 to 1000) psi (>1000 to 3000) psi (>3000 to 6000) psi (0 to 3000) psi (>3000 to 30000) psi	0.0023 H_2O 0.0036 psia (0.0001x+0.00008) psia 0.0036 psia 0.0007 psi 0.0036 psi 0.012 psi 0.059 psi (0.0001x +0.014) psi (0.000008x +0.34) psi (0.0001x +0.0033) psi (0.0002x +0.0024) psi (0.0002x +0.0009) psi	Pressure transducer Electronic deadweight tester
Tachometers[3] – Non-Contact	(0.6 to 100 000) rpm	0.00025 % + 300 µrpm	Multi-function calibrator
Torque Wrenches & Screwdrivers[3] – Clockwise and Counter Clockwise	(5 to 100) in·lbf (25 to 500) ft·lbf	(0.0063*x* + 0.03) in·lbf (0.0066*x* + 0.05) in·lbf	Electronic transducer

Parameter/Equipment	Range	CMC[2] (±)	Comments
Laboratory Scales & Balances[3]	1 mg to 10g (10 to 100) g 100g to 1 kg (1 to 5) kg (5 to 10) kg (10 to 20) kg (20 to 80) kg	0.03 mg 0.20 mg 1.9 mg 14 mg 33 mg 61 mg 130 mg	ASTM Class 1 & 0 weights
Force Measuring Devices[3] Tension & Compression	 (1 to 10) lbf (11 to 250) lbf (251 to 2000) lbf	 0.0014 lbf + 0.6*R* (0.0004x + 0.02 lbf) + 0.6*R* (0.0003x + 0.2 lbf) +0.6*R*	 Load cell class A 0.6*R* = 0.6 x Resolution of UUT

IV. Thermodynamics

Parameter/Equipment	Range	CMC[2] (±)	Comments
Thermocouple Probes –			
Type J	-82.5 ºC (-30 to 125) ºC (126 to 420) ºC (421 to 600) ºC (601 to 962) ºC	0.26 ºC 0.19 ºC 0.30 ºC 0.81 ºC 1.4 ºC	ASTM 220, ASTM 230
Type K	-82.5 ºC (-30 to 125) ºC (126 to 420) ºC (421 to 600) ºC (601 to 962) ºC (963 to 1250) ºC	0.26 ºC 0.19 ºC 0.3 ºC 0.81 ºC 1.4 ºC 2.3 ºC	
Type T	-82.5 ºC (-30 to 125) ºC (126 to 420) ºC	0.26 ºC 0.19 ºC 0.30 ºC	

Parameter/Equipment	Range	CMC[2] (±)	Comments
Thermocouple Probes – (cont)			
Type E	-82.5 ºC (-30 to 125) ºC (126 to 420) ºC (421 to 600) ºC (601 to 962) ºC	0.26 ºC 0.19 ºC 0.30 ºC 0.81 ºC 1.4 ºC	ASTM 220, ASTM 230
Type N	(-30 to 125) ºC (126 to 420) ºC (421 to 600) ºC (601 to 962) ºC (963 to 1250) ºC	0.19 ºC 0.30 ºC 0.81 ºC 1.4 ºC 2.3 ºC	
Type R, Type S	(101 to 420) ºC (421 to 600) ºC (601 to 962) ºC (963 to 1250) ºC	0.39 ºC 0.81 ºC 1.4 ºC 2.3 ºC	
Type B	(421 to 600) ºC (601 to 962) ºC (963 to 1250) ºC	0.86 ºC 1.4 ºC 2.3 ºC	
Humidity – Measuring Equipment[3]	Up to 80 % RH	1.3 % RH	Thermohygrometer
Temperature – Measuring Equipment[3]	23 ºC	0.30 ºC	Thermohygrometer
Temperature[3] (Infrared)	35 ºC (>35 to 100) ºC (>100 to 250) ºC (>250 to 350) ºC (>350 to 500) ºC	0.46 ºC 0.70 ºC 1.2 ºC 1.8 ºC 2.4 ºC	Precision IR calibrator
RTD Probes	-82.5 ºC (-30 to 125) ºC (126 to 420) ºC	0.21 ºC 0.10 ºC 0.28 ºC	ASTM E644

V. Time & Frequency

Parameter/Equipment	Range	CMC[2, 4] (±)	Comments
Frequency – Measure[3]	DC to 350 MHz	0.00013 %	Universal frequency counter/timer
Frequency – Measuring Equipment[3]	1 μHz to 80 MHz (80 to 1100) MHz	0.00012 % 0.0058 %	Waveform generators
Timers and Stopwatches[3]	≤ 24 hr	38 ms	Universal frequency counter/timer Waveform generators

[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. CMC's 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] In the statement of CMC, L is the numerical value of the nominal length of the device measured in inches. In the statement of CMC, percent is defined as percent of reading unless otherwise noted. In the statement of CMC, x is defined as the torque or mass flow applied.

[5] The stated measured values are determined using the indicated instrument (see Comments). This capability is suitable for the calibration of the devices intended to measure or generate the measured value in the ranges indicated. CMCs are expressed as either a specific value that covers the full range or as a percent or fraction of the reading plus a fixed floor specification.