



SCOPE OF ACCREDITATION TO ISO/IEC 17025:2005,
ANSI/NCSL Z540-1-1994 & ANSI/NCSL Z540.3-2006

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CALIBRATION

Valid To: April 30, 2019

Certificate Number: 2737.02

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

I. Electrical – DC/Low Frequency

Parameter/Equipment	Range	CMC ^{2, 5} (±)	Comments
DC Voltage – Generate ^{3, 4}	(0 to 330) mV 330 mV to 3.3 V (3.3 to 33) V (33 to 330) V (330 to 1000) V	23 µV/V + 1.0 µV 14 µV/V + 2.0 µV 14 µV/V + 20 µV 22 µV/V + 150 µV 22 µV/V + 1.5 mV	Fluke 5520A
DC Voltage – Measure ^{3, 4}	(0 to 100) mV 100 mV to 1 V (1 to 10) V (10 to 100) V (100 to 1000) V (1 to 6) kV	12 µV/V + 0.3 µV 10 µV/V + 3 µV 10 µV/V + 0.5 µV 13 µV/V + 30 µV 13 µV/V + 100 µV 3.8 %	HP 3458A Fluke 80k6 w/Agilent 34401A
DC Current – Generate ^{3, 4}	(0 to 3.3) mA (3.3 to 330) mA 330 mA to 3 A (3 to 20) A	170 µA/A + 50 nA 120 µA/A + 2.5 µA 4.6 mA/A + 40 µA 9.3 mA/A + 1.5 mA	Fluke 5520A

Parameter/Equipment	Range	CMC ^{2, 5} (\pm)	Comments
DC Current – Measure ^{3, 4}	(0 to 100) nA 100 nA to 1 μ A (1 to 10) μ A (10 to 100) μ A 100 μ A to 1 mA (1 to 10) mA (10 to 100) mA 100 mA to 1 A	0.021 % + 40 pA 60 μ A/A + 40 pA 27 μ A/A + 100 pA 29 μ A/A + 800 pA 31 μ A/A + 5 nA 0.011 % + 50 nA 0.012 % + 500 nA 0.018 % + 10 μ A	HP 3458A
DC Resistance – Generate ^{3, 4}	(0 to 10.999) Ω (11 to 32.999) Ω (33 to 109.999) Ω (110 to 329.999) Ω (330 to 1.0999) k Ω (1.1 to 3.2999) k Ω (3.3 to 10.999) k Ω (11 to 32.999) k Ω (33 to 109.999) k Ω (110 to 329.999) k Ω 33 k Ω to 1.0999 M Ω (1.1 to 3.2999) M Ω (3.3 to 10.999) M Ω (11 to 32.999) M Ω (33 to 109.999) M Ω (110 to 329.999) M Ω (330 to 1100) M Ω	55 $\mu\Omega/\Omega$ + 1 m Ω 42 $\mu\Omega/\Omega$ + 1.5 m Ω 94 $\mu\Omega/\Omega$ + 1.4 m Ω 34 $\mu\Omega/\Omega$ + 2.0 m Ω 34 $\mu\Omega/\Omega$ + 2.0 m Ω 37 $\mu\Omega/\Omega$ + 20 m Ω 19 $\mu\Omega/\Omega$ + 20 m Ω 37 $\mu\Omega/\Omega$ + 200 m Ω 37 $\mu\Omega/\Omega$ + 200 m Ω 40 $\mu\Omega/\Omega$ + 2 Ω 39 $\mu\Omega/\Omega$ + 2 Ω 73 $\mu\Omega/\Omega$ + 30 Ω 51 $\mu\Omega/\Omega$ + 50 Ω 0.032 % + 2.5 k Ω 0.057 % + 3 k Ω 3.4 m Ω/Ω + 100 k Ω 17 m Ω/Ω + 500 k Ω	Fluke 5520A
DC Resistance – Measure ^{3, 4}	(0 to 10) Ω (10 to 100) Ω (100 to 1) K Ω (1 to 10) K Ω (10 to 100) K Ω 100 K to 1 M Ω (1 to 10) M Ω (10 to 100) M Ω 100 M Ω to 1 G Ω	49 $\mu\Omega/\Omega$ + 50 $\mu\Omega$ 17 $\mu\Omega/\Omega$ + 500 $\mu\Omega$ 15 $\mu\Omega/\Omega$ + 500 $\mu\Omega$ 14 $\mu\Omega/\Omega$ + 5 m Ω 14 $\mu\Omega/\Omega$ + 50 m Ω 20 $\mu\Omega/\Omega$ + 2 Ω 66 $\mu\Omega/\Omega$ + 100 Ω 0.065 % + 1 k Ω 6.5 m Ω/Ω + 10 k Ω	HP 3458A

Parameter/Equipment	Range	CMC ² (±)	Comments
Electrical Calibration of Thermocouple Indicators ^{3, 4} –			
Type B	(600 to 800) °C (800 to 1000) °C (1000 to 1550) °C (1550 to 1820) °C	0.35 °C 0.27 °C 0.24 °C 0.26 °C	Fluke 5520A
Type C	(0 to 150) °C (150 to 650) °C (650 to 1000) °C (1000 to 1800) °C (1800 to 2316) °C	0.24 °C 0.21 °C 0.25 °C 0.39 °C 0.65 °C	
Type E	(-250 to -100) °C (-100 to -25) °C (-25 to 350) °C (350 to 650) °C (650 to 1000) °C	0.53 °C 0.14 °C 0.12 °C 0.14 °C 0.17 °C	
Type J	(-210 to -100) °C (-100 to -30) °C (-30 to 150) °C (150 to 760) °C (760 to 1200) °C	0.22 °C 0.14 °C 0.12 °C 0.14 °C 0.19 °C	
Type K	(-200 to -100) °C (-100 to -25) °C (-25 to 120) °C (120 to 1000) °C (1000 to 1372) °C	0.26 °C 0.15 °C 0.13 °C 0.21 °C 0.33 °C	
Type N	(-200 to -100) °C (-100 to -25) °C (-25 to 120) °C (120 to 410) °C (410 to 1300) °C	0.31 °C 0.18 °C 0.16 °C 0.15 °C 0.22 °C	

Parameter/Equipment	Range	CMC ² (±)	Comments
Electrical Calibration of Thermocouple Indicators ^{3,4} – (cont)			
Type R	(0 to 250) °C (250 to 400) °C (400 to 1000) °C (1000 to 1767) °C	0.45 °C 0.28 °C 0.26 °C 0.31 °C	Fluke 5520A
Type S	(0 to 250) °C (250 to 1000) °C (1000 to 1400) °C (1400 to 1767) °C	0.37 °C 0.28 °C 0.29 °C 0.36 °C	
Type T	(-250 to -150) °C (-150 to 0) °C (0 to 120) °C (120 to 400) °C	0.49 °C 0.19 °C 0.14 °C 0.15 °C	
Type U	(-200 to 0) °C (0 to 600) °C	0.44 °C 0.22 °C	
Electrical Calibration of RTD Indicators ^{3,4} –			
Pt 385, 100 Ω	(-200 to 0) °C (0 to 100) °C (100 to 300) °C (300 to 400) °C (400 to 630) °C (630 to 800) °C	0.068 °C 0.055 °C 0.070 °C 0.098 °C 0.11 °C 0.18 °C	Fluke 5520A
Pt 3926, 100 Ω	(-200 to 0) °C (0 to 100) °C (100 to 300) °C (300 to 400) °C (400 to 630) °C	0.039 °C 0.055 °C 0.070 °C 0.078 °C 0.093 °C	

Parameter/Equipment	Range	CMC ² (±)	Comments
Electrical Calibration of RTD Indicators ^{3,4} – (cont)			
Pt 3916, 100 Ω	(-200 to -190) °C (-190 to -80) °C (-80 to 0) °C (0 to 100) °C (100 to 260) °C (260 to 300) °C (300 to 400) °C (400 to 600) °C (600 to 630) °C	0.20 °C 0.032 °C 0.039 °C 0.076 °C 0.073 °C 0.084 °C 0.090 °C 0.096 °C 0.18 °C	Fluke 5520A
Pt 385, 200 Ω	(-200 to -80) °C (-80 to 100) °C (100 to 260) °C (260 to 300) °C (300 to 400) °C (400 to 600) °C (600 to 630) °C	0.032 °C 0.032 °C 0.039 °C 0.093 °C 0.11 °C 0.11 °C 0.12 °C	
Pt 385, 500 Ω	(-200 to -80) °C (-80 to 100) °C (100 to 260) °C (260 to 400) °C (400 to 600) °C (600 to 630) °C	0.032 °C 0.039 °C 0.047 °C 0.062 °C 0.070 °C 0.086 °C	
Pt 385, 1000 Ω	(-200 to 0) °C (0 to 100) °C (100 to 260) °C	0.024 °C 0.032 °C 0.039 °C	
PtNi 385, 120 Ω	(-80 to 0) °C (0 to 100) °C (100 to 260) °C	0.062 °C 0.062 °C 0.11 °C	
Cu 427, 10 Ω	(-100 to 260) °C	0.23 °C	

Parameter/Equipment	Range	CMC ^{2,5} (±)	Comments
Oscilloscope ^{3,4} –			
50 Ω Load	(1 to 24.999) mV 25 mV to 2.1999 V (2.2 to 130) V	0.25 % of output + 40 μV 0.24 % of output + 40 μV 0.27 % of output + 40 μV	Fluke 5520A/SC600
1 MΩ Load	(1 to 24.999) mV (25 to 109.99) mV 110 mV to 2.1999 V (2.2 to 10.999) V (11 to 130) V	0.12 % of output + 40 μV 0.09 % of output + 40 μV 0.31 % of output + 40 μV 0.21 % of output + 40 μV 0.14 % of output + 40 μV	
Level Sine Wave:			
Amplitude (50 kHz Reference)	50 kHz 50 kHz to 100 MHz (100 to 300) MHz (300 to 600) MHz	1.7 % + 300 μV 2.8 % + 300 μV 3.1 % + 300 μV 4.7 % + 300 μV	
Flatness (50 kHz Reference)	50 kHz to 100 MHz (100 to 300) MHz (300 to 600) MHz	1.4 % + 100 μV 1.7 % + 100 μV 3.2 % + 100 μV	
Time Markers: Source and Period into a 50 Ω Load	5 s to 50 ms 20 ms to 2 ns	160 μs + <i>t</i> parts in 10 ⁶ 69 μs + <i>t</i> parts in 10 ⁶	Fluke 5520A/SC600 <i>t</i> = time in seconds
Amplitude 1 MΩ 50 Ω	1.8 mV to 55 V _(pk-pk) 1.8 mV to 2.5 V _(pk-pk)	2.4 % + 100 μV 2.4 % + 100 μV	
Frequency	10 Hz to 100 kHz	160 parts in 10 ⁶ + 15 mHz	

Parameter/Equipment	Range	CMC ^{2,5} (±)	Comments
AC Power ^{3,4} @ (45 to 65) Hz – PF=1			
(3.3 to 9) mA	(33 to 330) mV (0.33 to 1020) V	0.11 % 0.10 %	Fluke 5520A
(9 to 33) mA	(33 to 330) mV (0.33 to 1020) V	0.08 % 0.06 %	
(33 to 90) mA	(33 to 330) mV (0.33 to 1020) V	0.11 % 0.09 %	
(90 to 330) mA	(33 to 330) mV (0.33 to 1020) V	0.08 % 0.06 %	
(0.33 to 0.9) A	(33 to 330) mV (0.33 to 1020) V	0.10 % 0.10 %	
(0.9 to 2.2) A	(33 to 330) mV (0.33 to 1020) V	0.09 % 0.07 %	
(2.2 to 4.5) A	(33 to 330) mV (0.33 to 1020) V	0.10 % 0.10 %	
(4.5 to 20.5) A	(33 to 330) mV (0.33 to 1020) V	0.09 % 0.31 %	
AC Voltage – Generate ^{3,4}			
(1 to 33) mV	(10 to 45) Hz 45 Hz to 10 kHz (10 to 20) kHz (20 to 50) kHz (50 to 100) kHz (100 to 500) kHz	0.064 % + 6 μV 0.012 % + 6 μV 0.016 % + 6 μV 0.078 % + 6 μV 0.27 % + 12 μV 0.62 % + 50 μV	Fluke 5520A
(33 to 330) mV	(10 to 45) Hz 45 Hz to 10 kHz (10 to 20) kHz (20 to 50) kHz (50 to 100) kHz (100 to 500) kHz	0.023 % + 8 μV 0.011 % + 8 μV 0.012 % + 8 μV 0.027 % + 8 μV 0.062 % + 32 μV 0.16 % + 70 μV	
(33 to 330) mV	(10 to 45) Hz 45 Hz to 10 kHz (10 to 20) kHz (20 to 50) kHz	0.023 % + 50 μV 0.012 % + 60 μV 0.018 % + 60 μV 0.027 % + 50 μV	

Parameter/Range	Frequency	CMC ^{2,5} (±)	Comments
AC Voltage – Generate ^{3,4} (cont)			
(33 to 330) mV	(50 to 100) kHz (100 to 500) kHz	0.059 % + 130 μV 0.22 % + 600 μV	Fluke 5520A
(3.3 to 33) V	45 Hz to 1 kHz (1 to 10) kHz (10 to 20) kHz (20 to 50) kHz (50 to 100) kHz	0.54 % + 650 μV 0.026 % + 600 μV 0.11 % + 600 μV 0.15 % + 600 μV 0.17 % + 1.6 mV	
(33 to 330) V	45 Hz to 1 kHz (1 to 10) kHz (10 to 20) kHz (20 to 50) kHz (50 to 100) kHz	0.23 % + 2 mV 0.23 % + 6 mV 0.24 % + 6 mV 0.40 % + 6 mV 0.43 % + 6 mV	
(330 to 1020) V	45 Hz to 1 kHz (1 to 5) kHz (5 to 10) kHz	0.41 % + 10 mV 0.41 % + 10 mV 0.40 % + 10 mV	
AC Voltage – Measure ^{3,4}			
Up to 10 mV	(1 to 40) Hz (40 to 1000) Hz (1 to 20) kHz (20 to 50) kHz (50 to 100) kHz (100 to 300) kHz	0.039 % + 3.0 μV 0.023 % + 1.1 μV 0.034 % + 1.1 μV 0.11 % + 1.1 μV 0.57 % + 1.1 μV 4.5 % + 2.0 μV	Agilent 3458A
(10 to 100) mV	(1 to 40) Hz (40 to 1000) Hz (1 to 20) kHz (20 to 50) kHz (50 to 100) kHz (100 to 300) kHz	0.049 % + 4 μV 0.12 % + 2 μV 0.045 % + 2 μV 0.091 % + 2 μV 0.12 % + 2 μV 0.35 % + 10 μV	

Parameter/Range	Frequency	CMC ^{2, 5} (±)	Comments
AC Voltage – Measure ^{3, 4}			
(0.1 to 1) V	(1 to 40) Hz 40 Hz to 1 kHz (1 to 20) kHz (20 to 50) kHz (50 to 100) kHz (100 to 300) kHz	0.008 % + 40 μV 0.008 % + 20 μV 0.016 % + 20 μV 0.034 % + 20 μV 0.091 % + 20 μV 0.34 % + 100 μV	Agilent 3458A
(1 to 10) V	(1 to 40) Hz 40 Hz to 1 kHz (1 to 20) kHz (20 to 50) kHz (50 to 100) kHz (100 to 300) kHz	0.043 % + 400 μV 0.027 % + 200 μV 0.023 % + 200 μV 0.41 % + 200 μV 0.094 % + 200 μV 0.34 % + 1 mV	
(10 to 100) V	(1 to 40) Hz 40 Hz to 1 kHz (1 to 20) kHz (20 to 50) kHz (50 to 100) kHz	0.21 % + 4 mV 0.21 % + 2 mV 0.21 % + 2 mV 0.28 % + 2 mV 0.31 % + 2 mV	
(100 to 1000) V	(1 to 40) Hz 40 Hz to 1 kHz (1 to 20) kHz (20 to 50) kHz (50 to 100) kHz	1.6 % + 40 mV 1.7 % + 20 mV 2.3 % + 20 mV 2.3 % + 20 mV 0.48 % + 20 mV	
Capacitance – Generate ^{3, 4}			
(0.19 to 0.3999) nF	10 Hz to 10 kHz	0.55 % + 10 pF	Fluke 5520A
(0.4 to 1.0999) nF	10 Hz to 10 kHz	0.42 % + 10 pF	
(1.1 to 3.2999) nF	10 Hz to 3 kHz	0.43 % + 10 pF	
(3.3 to 10.9999) nF	10 Hz to 1 kHz	0.19 % + 10 pF	
(11 to 32.9999) nF	10 Hz to 1 kHz	0.19 % + 100 pF	
(33 to 109.999) nF	10 Hz to 1 kHz	0.19 % + 100 pF	
(110 to 329.999) nF	10 Hz to 1 kHz	0.19 % + 300 pF	
(0.33 to 1.0999) μF	(10 to 600) Hz	0.19 % + 1 nF	
(1.1 to 3.299 99) μF	(10 to 300) Hz	0.19 % + 3 nF	
(3.3 to 10.9999) μF	(10 to 150) Hz	0.19 % + 10 nF	
(11 to 32.9999) μF	(10 to 120) Hz	0.31 % + 30 nF	

Parameter/Range	Frequency	CMC ^{2, 5} (±)	Comments
Capacitance – Generate ^{3, 4} (cont)			
(33 to 109.999) μF	(10 to 80) Hz	0.36 % + 100 nF	Fluke 5520A
(110 to 329.999) μF	(10 to 50) Hz	0.35 % + 300 nF	
(0.33 to 1.099 99) mF	(10 to 20) Hz	0.35 % + 1 μF	
(1.1 to 3.2999) mF	(0 to 6) Hz	0.35 % + 3 μF	
(3.3 to 10.9999) mF	(0 to 2) Hz	0.35 % + 10 μF	
(11 to 32.9999) mF	(0 to 0.6) Hz	0.58 % + 30 μF	
(33 to 110) mF	(0 to 0.2) Hz	0.85 % + 100 μF	
AC Current – Generate ^{3, 4}			
(29 to 329.99) μA	(10 to 45) Hz	0.16 % + 100 nA	Fluke 5520A
	45 Hz to 1 kHz	0.097 % + 100 nA	
	(1 to 5) kHz	0.23 % + 150 nA	
	(5 to 10) kHz	0.62 % + 200 nA	
	(10 to 30) kHz	1.2 % + 400 nA	
(0.33 to 3.2999) mA	(10 to 45) Hz	0.16 % + 150 nA	
	45 Hz to 1 kHz	0.078 % + 150 nA	
	(1 to 5) kHz	0.16 % + 200 nA	
	(5 to 10) kHz	0.39 % + 300 nA	
	(10 to 30) kHz	0.78 % + 600 nA	
(3.3 to 32.999) mA	(10 to 45) Hz	0.14 % + 2 μA	
	45 Hz to 1 kHz	0.10 % + 2 μA	
	(1 to 5) kHz	0.062 % + 2 μA	
	(5 to 10) kHz	0.16 % + 3 μA	
	(10 to 30) kHz	1.1 % + 4 μA	
(33 to 329.99) mA	(10 to 45) Hz	0.140 % + 20 μA	
	45 Hz to 1 kHz	0.032 % + 20 μA	
	(1 to 5) kHz	0.078 % + 50 μA	
	(5 to 10) kHz	0.16 % + 100 μA	
	(10 to 30) kHz	0.31 % + 200 μA	
(0.33 to 1.09999) A	(10 to 45) Hz	0.14 % + 100 μA	
	45 Hz to 1 kHz	0.04 % + 100 μA	
	(1 to 5) kHz	0.47 % + 1.0 mA	
	(5 to 10) kHz	1.9 % + 5.0 mA	

Parameter/Range	Frequency	CMC ^{2,5} (±)	Comments
AC Current – Generate ^{3,4} (cont)			
(1.1 to 2.99999) A	(10 to 45) Hz 45 Hz to 1 kHz (1 to 5) kHz (5 to 10) kHz	0.21 % + 100 μA 0.13 % + 100 μA 0.14 % + 1000 μA 2.0 % + 5000 μA	Fluke 5520A
(3 to 10.9999) A	(45 to 100) Hz (0.1 to 1) kHz (1 to 5) kHz	0.31 % + 2 mA 0.31 % + 2 mA 2.4 % + 2 mA	
(11 to 20.5) A	(45 to 100) Hz (0.1 to 1) kHz (1 to 5) kHz	0.54 % + 5 mA 0.55 % + 5 mA 2.5 % + 5 mA	

II. Electrical – RF/Microwave

Parameter/Range	Frequency	CMC ^{2,5} (±)	Comments
Amplitude Modulation – Measure ^{3,4}			
Rate: 50 Hz to 10 kHz, Depth: 5 % to 99 %	(0.15 to 10) MHz	4.1 % of rdg + 1 digit	Agilent 8902A measuring receiver plus Agilent 11722A power sensor
Rate: 20 Hz to 10 kHz, Depth: 5 % to 99 %	(0.15 to 10) MHz	5.0 % of rdg + 1 digit	
Rate: 50 Hz to 50 kHz, Depth: 5 % to 99 %	(10 to 1300) MHz	3.6 % of rdg + 1 digit	
Rate: 20 Hz to 100 kHz, Depth: 5 % to 99 %	(10 to 1300) MHz	4.6 % of rdg + 1 digit	
Rate: 50 Hz to 50 kHz, Depth: 5 % to 99 %	(1.3 to 26.5) GHz	4.0 % of rdg + 1 digit	
Rate: 20 Hz to 100 kHz, Depth: 5 % to 99 %	(1.3 to 26.5) GHz	5.3 % of rdg + 1 digit	

Parameter/Range	Frequency	CMC ^{2,5} (\pm)	Comments
Frequency Modulation – Measure ^{3,4} Rate: 20 Hz to 10 kHz, \leq 40 kHz Peak Rate: 50 Hz to 100 kHz, \leq 400 kHz Peak Rate: 20 Hz to 200 kHz, \leq 400 kHz Peak Rate: 50 Hz to 100 kHz, \leq 400 kHz Peak Rate: 20 Hz to 200 kHz, \leq 400 kHz Peak	(0.25 to 10) MHz (10 to 1300) MHz (10 to 1300) MHz (0.01 to 26.5) GHz (0.01 to 26.5) GHz	4.1 % of rdg + 1 digit 3.4 % of rdg + 1 digit 7.3 % of rdg + 1 digit 2.7 % of rdg + 1 digit 7 % of rdg + 1 digit	Agilent 8902A measuring receiver plus Agilent 11722A power sensor
Phase Modulation – Measure ^{3,4} Rate: 200 Hz to 10 kHz Rate: 200 Hz to 20 kHz Rate: 200 Hz to 20 kHz	(0.15 to 10) MHz (10 to 1300) MHz 10 MHz to 26.5 GHz	6.1 % of rdg + 1 digit 5.1 % of rdg + 1 digit 4.6 % of rdg + 1 digit	Agilent 8902A measuring power receiver plus Agilent 11722A powers sensor
RF Absolute Power – Measure ^{3,4} (+20 to -60) dBm, 50 Ω (+20 to -70) dBm, 50 Ω	9 kHz to <30 MHz 30 MHz to <2 GHz (2 to <6) GHz 100 MHz to <8 GHz (8 to <18) GHz (18 to 26.5) GHz	0.20 dBm 0.14 dBm 0.16 dBm 0.18 dBm 0.19 dBm 0.23 dBm	Agilent E4418A power meter with E9304A power sensor Agilent E4418A power meter with E4413A power sensor

Parameter/Range	Frequency	CMC ^{2,5} (±)	Comments
RF Relative Power – Measure ^{3,4} 0 dB, Reference (-0.0 to -10) dB (-10 to -20) dB (-20 to -30) dB (-30 to -40) dB (-40 to -50) dB (-50 to -60) dB (-60 to -70) dB (-70 to -80) dB (-80 to -90) dB (-90 to -100) dB (-100 to -110) dB (-110 to -127) dB	100 kHz to 26.5 GHz	Reference 0.25 dB 0.25 dB 0.25 dB 0.25 dB 0.25 dB 0.25 dB 0.25 dB 0.25 dB 0.25 dB 0.25 dB 0.27 dB 0.30 dB	HP 8902A measuring receiver with 11722A / 11792A power sensor

III. Mechanical

Parameter/Equipment	Range	CMC ² (±)	Comments
Pressure Gauges, Transducers & Calibrators – Measure & Measuring Equipment ^{3,4}	(0 to 15) psia	0.024 psia	Fluke 700PA4
	(0 to 100) psi	0.073 psi	Fluke 700P06
	(0 to 1000) psi	0.61 psi	Fluke 700P08
	(0 to 10 000) psi	9.3 psi	Fluke 700P31
Torque Equipment ^{3,4}	(5 to 50) in·lbf (40 to 400) in·lbf (100 to 1000) in·lbf (25 to 250) ft·lbf	0.30 in·lbf 2.4 in·lbf 5.9 in·lbf 1.5 ft·lbf	CDI 4 in 1 suretest

IV. Time & Frequency

Parameter/Equipment	Range	CMC ² (±)	Comments
Stopwatches ^{3,4}	Up to 86 400 s	30 ms	Agilent 53131A-030 counter phase locked to GPS
Frequency – Measure ^{3,4}	1 mHz to 40 GHz	$1.2 \times 10^{-9} \times f + 5 \mu\text{Hz}$	Agilent 53131A-030, HP5352B counters phase locked to GPS <i>f</i> is the frequency
Frequency – Measuring Equipment ^{3,4}	10 MHz 1 mHz to 40 GHz	$1.2 \times 10^{-9} \times f$ $1.2 \times 10^{-9} \times f + 5 \mu\text{Hz}$	Datum GPS Receiver Agilent 3325B, Agilent 83640L generators phase locked to GPS <i>f</i> is the frequency

¹ This laboratory offers commercial 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 This laboratory meets A2LA R104 – *General Requirements: Accreditation of Field Testing and Field Calibration Laboratories* for their Mobile Laboratory to perform the noted calibrations.

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. CMC are expressed as either a specific value that covers the full range or as a fraction/percent of the reading plus a fixed floor specification.



Accredited Laboratory

A2LA has accredited

ACUCAL, INC.

Elizabeth City, NC

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 the requirements of ANSI/NCSLI Z540.3-2006 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 24th day of August 2017.

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

President and CEO
For the Accreditation Council
Certificate Number 2737.02
Valid to April 30, 2019

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