

PERRY JOHNSON LABORATORY ACCREDITATION, INC.

Certificate of Accreditation

Perry Johnson Laboratory Accreditation, Inc. has assessed the Laboratory of:

Global Calibration, LLC

1507-11 Smithtown Avenue, Bohemia, NY 11716

(Hereinafter called the Organization) and hereby declares that Organization 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 (as outlined by the joint ISO-ILAC-IAF Communiqué dated April 2017):

Electrical, Dimensional Calibration, Mechanical, Time & Frequency, and Thermodynamic (As detailed in the supplement)

Accreditation claims for such testing and/or calibration services shall only be made from addresses referenced within this certificate. This Accreditation is granted subject to the system rules governing the Accreditation referred to above, and the Organization hereby covenants with the Accreditation body's duty to observe and comply with the said rules.

For PJLA:

Tracy Szerszen President

Perry Johnson Laboratory Accreditation, Inc. (PJLA) 755 W. Big Beaver, Suite 1325 Troy, Michigan 48084

 Initial Accreditation Date:
 Issue Date:
 Expiration Date:

 November 01, 2017
 November 26, 2023
 November 26, 2025

 Accreditation No.:
 Certificate No.:

 85580
 L23-854

The validity of this certificate is maintained through ongoing assessments based on a continuous accreditation cycle. The validity of this certificate should be confirmed through the PJLA website: <u>www.pjlabs.com</u>



Global Calibration, LLC

1507-11 Smithtown, Bohemia, NY 11716 Contact Name: Mr. Charles Mahoney Phone: 631-750-5663

MEASURED INSTRUMENT, QUANTITY OR GAUGE	RANGE OR NOMINAL DEVICE SIZE AS APPROPRIATE	CALIBRATION AND MEASUREMENT CAPABILITY EXPRESSED AS AN UNCERTAINTY (±)	CALIBRATION EQUIPMENT AND REFERENCE STANDARDS USED
Equipment to Measure	Up to 330 mV	$17 \ \mu V + 39.3 \ \mu V/V$	Fluke 5502A
DC Voltage ^{FO}	0.33 mV to 33 V	$0.51 \ \mu V + 0.18 \ \mu V/V$	GC 146
	3.3 V to 33 V	$5.9 \text{ mV} + 9.9 \mu \text{V/V}$	-
	33 V to 330 V	$42 \text{ mV} + 17 \mu \text{V/V}$	
	330 V to 1 020 V	$150 \text{ mV} + 17 \mu \text{V/V}$	
Equipment to Output	Up to 100 mV	$1.9 \ \mu V + 1.9 \ nV/mV$	HP 3458A/Opt 2
DC Voltage ^{FO}	100 mV to 1 V	$15 \ \mu V + 1.9 \ nV/mV$	GC 174
	1V to 10 V	$52 \mu V + 4.2 \mu V/V$	-
	10 V to 100 V	$72 \mu V + 6.6 \mu V/V$	-
	100 V to 1 000 V	$5.5 \text{ mV} + 6.5 \mu \text{V/V}$	
Equipment to Measure AC Voltage At the Listed Frequencies ^{FO}			Fluke 5502A GC 146
10 Hz to 45 Hz	Up to 33 mV	0.18 mV + 1.3 mV/V	
45 Hz to 10 kHz	Up to 33 mV	$58 \mu V + 1.2 m V/V$	
10 kHz to 20 kHz	Up to 33 mV	74 µV +2.4 mV/V	1
20 kHz to 50 kHz	Up to 33 mV	$55 \mu V + 2.3 m V/V$	
50 kHz to 100 kHz	Up to 33 mV	62 μV +3.7 mV/V	
100 kHz to 500 kHz	Up to 33 mV	0.43 mV + 0.82 mV/V	1
Equipment to Measure AC Voltage At the Listed Frequencies ^{FO}			
10 Hz to 45 Hz	33 mV to 330 mV	0.13 mV + 2.7 mV/V	
45 Hz to 10 kHz	33 mV to 330 mV	$49 \ \mu V + 0.53 \ mV/V$	
10 kHz to 20 kHz	33 mV to 330 mV	$25 \mu V + 1.7 m V/V$	
20 kHz to 50 kHz	33 mV to 330 mV	$47 \ \mu V + 1.9 \ m V/V$	
50 kHz to 100 kHz	33 mV to 330 mV	$200 \ \mu V + 2.9 \ mV/V$	-
100 kHz to 500 kHz	33 mV to 330 mV	0.41 mV + 0.82 mV/V	
Equipment to Measure AC Voltage At the Listed Frequencies ^{FO}]
10 Hz to 45 Hz	0.33 V to 3.3 V	0.14 mV + 0.33 mV/V	
45 Hz to 10 kHz	0.33 V to 3.3 V	0.14 mV + 0.34 mV/V	
10 kHz to 20 kHz	0.33 V to 3.3 V	0.18 mV + 1.1 mV/V	
20 kHz to 50 kHz	0.33 V to 3.3 V	0.36 mV + 1.6 mV/V	
50 kHz to 100 kHz	0.33 V to 3.3 V	1.9 mV + 2.9 mV/V	
100 kHz to 500 kHz	0.33 V to 3.3 V	3.7 mV +6.2 mV/V	



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Equipment to Measure AC	Fluke 5502A		
At the Listed Frequencies FC	GC 146		
10 Hz to 45 Hz	3.3 V to 33 V	3.5 mV + 1.7 mV/V	-
45 Hz to 10 kHz	3.3 V to 33 V	4.3 mV + 0.38 mV/V	-
10 kHz to 20 kHz	3.3 V to 33 V	20 mV + .92 mV	-
20 kHz to 50 kHz	3.3 V to 33 V	6.6 mV + 2.2 mV/V	-
50 kHz to 100 kHz	3.3 V to 33 V	20 mV + 2.9 mV/V	
Equipment to Measure AC At the Listed Frequencies FC			Fluke 5502A GC 146
45 Hz to 1 kHz	33 V to 330 V	20 mV + 0.92 mV/V]
1 kHz to 10 kHz	33 V to 330 V	20 mV + 0.92 mV/V]
10 kHz to 20 kHz	33 V to 330 V	0.01 V + 5.9m V/V	1
Equipment to Measure AC At the Listed Frequencies		\mathbf{Q}	
45 Hz to 1 kHz	33 V to 330 V	20 mV + 0.92 mV/V	
1 kHz to 10 kHz	33 V to 330 V	20 mV + 0.92 mV/V	
10 kHz to 20 kHz	33 V to 330 V	0.01 V + 5.9 m V/V	1
Equipment to Output AC V At the Listed Frequencies FG		4-0	HP 3458A/Opt 2 GC 174
1 Hz to 40 Hz	Up to 10 mV	$0.1 \text{ mV} + 0.85 \mu \text{V/mV}$	1
40 Hz to 1 kHz	Up to 10 mV	$17 \mu V + 0.23 \mu V/mV$	1
1 kHz to 20kHz	Up to 10 mV	$10 \ \mu V + 0.32 \ \mu V/mV$	
20kHz to 50 kHz	Up to 10 mV	$1.4 \ \mu V + 1.2 \ \mu V/mV$	1
50 kHz to 100 kHz	Up to 10 mV	$1.7 \ \mu V + 5.8 \ \mu V/mV$	1
100 kHz to 300 kHz	Up to 10 mV	$4.2 \ \mu V + 46 \ \mu V/mV$	1
Equipment to Output AC V At the Listed Frequencies FO		1	1
1 Hz to 40 Hz	10 mV to 100 mV	4.1 μ V + 0.13 μ V/mV]
40 Hz to 1 kHz	10 mV to 100 mV	$13 \ \mu V + 48 \ nV/mV$	1
1 kHz to 20kHz	10 mV to 100 mV	$13 \ \mu V + 98 \ nV/mV$	1
20kHz to 50 kHz	10 mV to 100 mV	$9.3 \ \mu V + 0.12 \ \mu V/mV$	1
50 kHz to 100 kHz	10 mV to 100 mV	$7.6 \ \mu V + 1.1 \ \mu V/mV$	1
100 kHz to 300 kHz	10 mV to 100 mV	$16 \mu V + 3.4 \mu V/mV$	1
300 kHz to 1 MHz	10 mV to 100 mV	$82 \ \mu V + 11 \ \mu V/mV$	1
1MHz to 2 MHz	10 mV to 100 mV	$61 \mu V + 17 \mu V/mV$	1



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Equipment to Output AC V At the Listed Frequencies F			HP 3458A/Opt 2 GC 174
1 Hz to 40 Hz	0.1 V to 1 V	$92 \mu V + 60 nV/mV$	
40 Hz to 1 kHz	0.1 V to 1 V	$64 \mu V + 71 nV/mV$	
1 kHz to 20kHz	0.1 V to 1 V	$45 \mu\text{V} + 0.16 \text{nV/mV}$	
20kHz to 50 kHz	0.1 V to 1 V	$63 \mu\text{V} + 0.15 \mu\text{V/mV}$	
50 kHz to 100 kHz	0.1 V to 1 V	$0.39 \text{ mV} + 0.88 \mu \text{V/mV}$	
100 kHz to 300 kHz	0.1 V to 1 V	$0.13 \text{ mV} + 3.7 \mu \text{V/mV}$	
300 kHz to 1 MHz	0.1 V to 1 V	$0.78 \text{ mV} + 11 \mu \text{V/mV}$	
1MHz to 2 MHz	0.1 V to 1 V	$0.69 \text{ mV} + 17 \mu \text{V/mV}$	
Equipment to Output AC V At the Listed Frequencies F	0		
1 Hz to 40 Hz	1 V to 10 V	0.73 mV + 77 mV/mV	
40 Hz to 1 kHz	1 V to 10 V	$0.46 \text{ mV} + 81 \mu \text{V/mV}$	
1 kHz to 20kHz	1 V to 10 V	$0.22 \text{ mV} + 18 \mu \text{V/mV}$	
20kHz to 50 kHz	1 V to 10 V	0.63 mV + 0.15 mV/mV	
50 kHz to 100 kHz	1 V to 10 V	0.8 mV + 1.1 mV/V	
100 kHz to 300 kHz	1 V to 10 V	1.3 mV + 3.7 mV/V	
300 kHz to 1 MHz	1 V to 10 V	7.8 mV + 11 mV/V	
1MHz to 2 MHz	1 V to 10 V	6.9mV + 17 mV/V	
Equipment to Output AC V At the Listed Frequencies Fo			
1 Hz to 40 Hz	10 V to 100 V	4.5 mV + 0.24 mV/V	
40 Hz to 1 kHz	10 V to 100 V	4.1 mV + 0.22 mV/V	
1 kHz to 20kHz	10 V to 100 V	4 mV + 0.23 mV/V	
20kHz to 50 kHz	10 V to 100 V	6 mV + 0.21 mV/V	
50 kHz to 100 kHz	10 V to 100 V	5.5 mV + 1.5 mV/V	
100 kHz to 300 kHz	10 V to 100 V	13 mV + 4.8 mV/V	
300 kHz to 1 MHz	10 V to 100 V	78 mV +11 mV/V	
Equipment to Output AC V At the Listed Frequencies Fe	о С		
1 Hz to 40 Hz	100 V to 1 000 V	81 mV + 0.43 mV/V	
40 Hz to 1 kHz	100 V to 1 000 V	220 mV + 0.29 mV/V	
1 kHz to 20kHz	100 V to 1 000 V	190 mV + 0.71 mV/V	
20kHz to 50 kHz	100 V to 1 000 V	62 mV + 0.65 mV/V	
50 kHz to 100 kHz	100 V to 1 000 V	40 mV + 3.5 mV/V	

This supplement is in conjunction with certificate # L23-854



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Equipment to Measure	2 Ω to 10.9 Ω	$0.45 \ \Omega + 5.5 \ \mu\Omega/\Omega$	Fluke 5502A
Resistance FO	11 Ω to 32.9 Ω	$0.45 \ \Omega + 6.2 \ \mu\Omega/\Omega$	GC 146
	33 Ω to 109 Ω	$0.45 \ \Omega + 5.6 \ \mu\Omega/\Omega$	
	110 Ω to 329 Ω	$0.45 \ \Omega + 8.3 \ \mu\Omega/\Omega$	
	330 Ω to 1 090 Ω	$0.48 \ \Omega + 0.27 \ m\Omega/k\Omega$	
	1.1 KΩ to 3.29 KΩ	$0.45 \ \Omega + 54 \ \Omega/k\Omega$	
	3.3 KΩ to 10.9 KΩ	$0.89 \ \Omega + 95 \ m\Omega/k\Omega$	
	11 KΩ to 32.9 KΩ	$1.5 \ \Omega + 88 \ m\Omega/k\Omega$	
	33 KΩ to 109 KΩ	$17 \Omega + 86 m\Omega/k\Omega$	
	110 KΩ to 329 KΩ	15 Ω + 0.12 Ω/kΩ	
	330 KΩ to 1 090 KΩ	$160 \ \Omega + 0.12 \ \Omega/k\Omega$	
	1.1 M Ω to 3.29 M Ω	$51 \Omega + 0.19 \Omega/k\Omega$	
	3.3 MΩ to 10.9 MΩ	$1.1 \text{ k}\Omega + 0.67 \Omega/\text{k}\Omega$	
	11 MΩ to 32.9 MΩ	$12 k\Omega + 0.96 \Omega/k\Omega$	
	33 M Ω to 109 M Ω	190 kΩ + 5.7 Ω/kΩ	
	110 MΩ to 330 MΩ	690 kΩ + 4.4 Ω/kΩ	
Equipment to Source	Up to 10 Ω	$1.9 \text{ m}\Omega + 1.4 \mu\Omega/\Omega$	HP 3458A Opt.2 (4 wire
Resistance FO	10Ω to 100Ω	$3.89 \text{ m}\Omega + 2.5 \mu\Omega/\Omega$	Ω) GC 174
	100 Ω to 1 kΩ	$0.29 \ \Omega + 1.2 \ m\Omega / k\Omega$	HP 3458A Opt.2 (2 wire
	1 kΩ to 10 kΩ	$3.2 \Omega + 3.9 \text{ m}\Omega/\text{k}\Omega$	Ω) GC 174
	10 k Ω to 100 k Ω	$3.2 \Omega + 3.9 \mathrm{m}\Omega/\mathrm{k}\Omega$	
	$100 \text{ k}\Omega$ to $1 \text{ M}\Omega$	$3.1 \Omega + 26 \Omega/M\Omega$	
	$1 \text{ M}\Omega$ to $10 \text{ M}\Omega$	$120 \Omega + 60 \Omega/M\Omega$	
	$10 \text{ M}\Omega$ to $100 \text{ M}\Omega$	$12 \text{ K}\Omega + 51 \text{ k}\Omega/\text{M}\Omega$	
	100 M Ω to 1 G Ω	$1.7 \text{ M}\Omega + 4.4 \text{ k}\Omega/\text{M}\Omega$	



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Electrical	1	1	
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Equipment to Measure	0.02 mA to 3.2 mA	0.6 uA + 0.65 uA/mA	Fluke 5502A
DC Current FO	3.3 mA to 32 mA	6 uA + 0.038 uA/mA	GC 146
	33 mA to 320 mA	74 uA + 0.77 uA/mA	
	320 mA to 2.1 A	880 uA + 0.16 mA/mA	
	2.2 A to 11 A	4.4 mA 0.69 uA/mA	
Equipment to Output	1 nA to 100 nA	0.8 nA	HP 3458A/Opt 2
DC Current FO	0.1 μA to 1 μA	0.01 + 8.1 nA/uA	GC 174
	1 μA to 10 μA	0.8 nA + 9.3 pA/uA	
	10 uA to 100 µA	0.56 pA + 33 pA/uA	
	0.1 mA to 1 mA	7.7 nA + 28 nA/mA	
	1 mA to 10 mA	7.6 nA + 28 nA/mA	
	10 mA to 100mA	0.59 μA + 46 nA/mA	
	0.1 mA to 1mA	12 μA + 13 μA/mA	
Equipment to Measure AC At the Listed Frequencies ^{F0}			Fluke 5502A GC 146
10 Hz to 20 Hz	Up to 330 uA	0.95 μA + 2.5 μA/mV	
20 Hz to 45 Hz	Up to 330 uA	$1.1 \ \mu A + 3 \ \mu A/mA$	
45 Hz to 1 kHz	Up to 330 uA	0.94 μA + 4.7 μA/mA	
1 kHz to 5 kHz	Up to 330 uA	0.89 μA + 6.1 μA/mA	
5 kHz to 10 kHz	Up to 330 uA	0.82 μA + 17 μA/mA	
Equipment to Measure AC At the Listed Frequencies F)		
10 Hz to 20 Hz	0.33 mA to 3.3 mA	$1.6 \text{ uA} + 2 \mu\text{A/mA}$	
20 Hz to 45 Hz	0.33 mA to 3.3 mA	$1.1 \ \mu A + 2.3 \ \mu A/mA$	
45 Hz to 1 kHz	0.33 mA to 3.3 mA	1.2 μA + 1.1 μA/mA	
1 kHz to 5 kHz	0.33 mA to 3.3 mA	1.4 μA + 5 μA/mA	
5 kHz to 10 kHz	0.33 mA to 3.3 mA	1.3 μA + 13 μA/mA	



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Equipment to Measure AC C			Fluke 5502A
At the Listed Frequencies FO			GC 146
10 Hz to 20 Hz	3.3 mA to 33 mA	$7.1 \ \mu A + 2.6 \ \mu A/mA$	
20 Hz to 45 Hz	3.3 mA to 33 mA	$6.7 \ \mu A + 2.4 \ \mu A/mA$	
45 Hz to 1 kHz	3.3 mA to 33 mA	7.7 μA + 1.2 μA/mA	
1 kHz to 5 kHz	3.3 mA to 33 mA	$25 \ \mu\text{A} + 3 \ \mu\text{A/mA}$	
5 kHz to 10 kHz	3.3 mA to 33 mA	5.8 μA + 9.4 μA/mA	
Equipment to Measure AC C At the Listed Frequencies ^{FO}	Current		
10 Hz to 20 Hz	33 mA to 330 mA	0.54 mA + 1.7 μA/mA	
20 Hz to 45 Hz	33 mA to 330 mA	0.55 mA + 1.3 μA/mA	
45 Hz to 1 kHz	33 mA to 330 mA	570 μA + 0.48 μA/mA	
1 kHz to 5 kHz	33 mA to 330 mA	0.89 μA + 6.1 μA/mA	
5 kHz to 10 kHz	33 mA to 330 mA	55 μA + 7.8 μA/mA	
Equipment to Measure AC C At the Listed Frequencies ^{FO}			
10 Hz to 45 Hz	0.33 A to 2.1 A	7.5 mA + 0.55 μA/mA	
45 Hz to 1 kHz	0.33 A to 2.1 A	7.1 mA + 0.51 μA/mA	
1 kHz to 5 kHz	0.33 A to 2.1 A	3.5 mA + 14 μA/mA	
Equipment to Measure AC C At the Listed Frequencies ^{FO}			
45 Hz to 65 Hz	2.2 A to 11 A	57 mA + 0.47 uA/mA	
65 Hz to 500 Hz	2.2 A to 11 A	58 mA + 0.3 uA/mA	
500 kHz to 1 kHz	2.2 A to 11 A	53 mA + 3.2 uA/mA	



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Capacitance – Source FO	0.33 nF to 0.49 nF	12 pF + 0.005 9 pF/pF	Fluke 5502A
	0.5 nF to 1.09 nF	1.7 pF + 16.2 nF/uF	GC 146
	1.1 nF to 3.29 nF	12 pF + 6 nF/uF	
	3.3 nF to 10.09 nF	12 pF + 5.9 nF/uF	
	11 nF to 32.9 nF	0.22 nF + 0.16 nF/uF	
	33 nF to 109 nF	0.59 nF + 1.4 nF/uF	
	110 nF to 329 nF	3.8 nF + 7.1 nF/uF	
	0.33 uF to 10.09 uF	80 nF + 0.092 nF/uF	
	11 uF to 32.9 uF	0.15 nF + 5.9nF/uF	
	33 uF to 100.9 uF	170 nF + 5.3nF/uF	
	110 uF to 329 uF	350 nF + 8.2nF/uF	
	330 uF to 1.1 mF	3.3 uF	
Oscilloscopes – DC Voltage ^{FO}	500 μV to 130 V 1 MΩ	$130 \ \mu V + 0.15 \ \mu V/mV$	Fluke 5800A GC 120
-	200 μV to 6.6 V 50 Ω	$46 \ \mu V + 2.9 \ \mu V/mV$	
Leveled Sine Wave Reference 50 kHz ^{FO}	5 mV to 5.5 Vp-p	0.34 mV + 24 mV/V (p-p)	
50 kHz to 100 MHz	5 mV to 5.5 Vp-p	0.035 mV + 42 mV/V (p-p)	
100 MHz to 100 MHz	5 mV to 5.5 Vp-p	0.35 mV + 65 mV/V (p-p)	
50 kHz to 300 MHz	5 mV to 5.5 Vp-p	0.035 mV + 65 mV/V (p-p)	
300 MHz to 500 MHz	5 mV to 5.5 Vp-p	0.35 mV + 65 mV/V (p-p)	
500 MHz to 600 MHz	5 mV to 5.5 Vp-p	0.35 mV + 71 mV/V (p-p)	



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Square wave 50Ω Load	1 mV to 24.9 mV	44 uV + 3.1 uV/mV	Fluke 5800A
(> 1 kHz) ^{FO}	25 mV to 109 mV	46 uV + 2.9 uV/mV	GC 120
	110 mV to 2.1 V	57 uV + 2.9 uV/mV	
	2.2 V to 6.6 V	110 uV + 2.9 uV/mV	
Square wave 1 M Ω Load	1 mV to 24.9 mV	$46 \ \mu V + 0.59 \ \mu V/mV$	
$(10 \text{ Hz to } 10 \text{ kHz})^{\text{FO}}$	25 mV to 109 mV	$49 \ \mu V + 0.57 \ \mu V/mV$	
	110 mV to 2.1 V	$74 \ \mu V + 0.36 \ \mu V/mV$	
	2.2 V to 10.9 V	$530 \ \mu V + 0.58 \ \mu V/mV$	
	11 V to 130 V	20 mV + 1.5 mV/V	
Time Marker FO	2 ns to 5 ns	0.58 ps/ns	
	10 ns	6 ps	
	20 ns to 50 ns	0.58 ps/ns	
	100 ns to 20 ms	77 ps/ns	
	50 ms to 5 s	580 ps/ms	
Rise Time ^{FO}	50 Ω load	289 ps	
Input Resistance Measurement FO	40 Ω to 60 Ω	$0.52 \text{ m}\Omega + 1.3 \text{ m}\Omega/\Omega$	Fluke 5800A
	500 k Ω to 1.5 M Ω	$22 \Omega + 1.2 \mathrm{k}\Omega/\mathrm{M}\Omega$	Oscilloscope Calibrator
Input Capacitance Measurement ^{FO}	5 pF to 50 pF	0.58 pF + 0.058 pF/pF	Fluke user manual DUT Manual GC 120

Thermodynamic

Thermouynamic			
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Thermocouple Simulation	-200 °C to -100 °C	0.47 °C	Fluke 5502A
Type N ^{FO}	-100 °C to -25 °C	0.32° C	GC 106
	-25 °C to 410 °C	0.3 °C	
	410 °C to 1 300 °C	0.36 °C	
Thermocouple Simulation	-200 °C to -100 °C	0.41°C	
Type K ^{FO}	-100 °C to -25 °C	0.3 °C	
	-25 °C to 120 °C	0.29 °C	
	120 °C to 1 000 °C	0.35 °C	
	1 000 °C to 1 372 °C	0.46 °C	



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Thermocouple Simulation	Up to 250 °C	0.62 °C	Fluke 5502A
Type R ^{FO}	250 °C to 400 °C	0.43 °C	GC 106
	400 °C to 1 000 °C	0.41 °C	
	1 000 °C to 1 767 °C	0.46 °C	_
Thermocouple Simulation	Up to 250 °C	0.53 °C	_
Type S ^{FO}	250 °C to 1 000 °C	0.43 °C	_
	1 000 °C to 1 400 °C	0.44 °C	_
	1 400 °C to 1 767 °C	0.52 °C	_
Thermocouple Simulation	-250 °C to -150 °C	0.67 °C	_
Type T ^{FO}	-150 °C to 0 °C	0.34 °C	_
	Up to 120 °C	0.29 °C	_
	120 °C to 400 °C	0.27 °C	_
Type K Thermocouples F	50 °C to 660 °C	0.13 + (0.000 608T) °C	Dry Well, SPRT, & HP 3458
Type N Thermocouples ^F	50 °C to 660 °C	0.19 + (0.000 785T) °C	GC 148
Type T Thermocouples F	50 °C to 400 °C	0.13 + (0.000 737T) °C	_
Temperature Measuring Systems ^F	-30 °C to 420 °C	0.015 °C	Fluke Dry Block & SPRT GC 128
Temperature Blocks ^F	-30 °C to 140 °C	0.015 °C	Fluke 1521 & SPRT GC 115
Temperature Chambers, Ovens, incubators ⁰	-30 °C to 200 °C	0.93 °C	"T" Thermocouples & Readout GC 137



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MEASURED INSTRUMENT, QUANTITY OR GAUGE	RANGE OR NOMINAL DEVICE SIZE AS APPROPRIATE	CALIBRATION AND MEASUREMENT CAPABILITY EXPRESSED AS AN UNCERTAINTY (±)	CALIBRATION EQUIPMENT AND REFERENCE STANDARDS USED
Pressure Gauge FO	Up to 10 inWC	(0.006 3 + 0.000 012 9 P) inWC	Ashcroft ATE & AQS1-10 GC 105B
	Up to 200 inWC	0.13 inWC	Ashcroft ATE & HQS1-200 GC 105B
	Up to 20 inWC	0.000 94 + (0.000 051 3 .9 P) inWC	Fluke 7250LP GC 105B
	20 to 60 inWC	0.000 32 + (000 095 9 P) inWC	7
	Up to 250 Psig	(0.005 7 + 0.001 3 P) Psig	Druck DPI 310A
	250 Psig to 1 250 Psig	(0.005 5 + 0.001 2 P) Psig	GC 105B
	1 250 psig to 6 250 psig	(0.009 1 + 0.001 1 P) psig	7
	6 250 psig to 12 500 psig	(0.078 + 0.001 4 P) psig	1
Torque Analyzers ^F	5 lbf·in to 100 lbf·in	0.006 9 + (0.000 795 TQ) lbf·in	Torque Wheel 5" & Class F weights GC 117
	10 lbf·in to 500 lbf·in	0.11 + (0.000 55 TQ) lbf in	Torque Wheel 10" & Class F weights GC 117
	360 lbf in to 2 400 lbf in	0.38 + (0.000 09 TQ) lbf in	Torque Arm 36" & Class F weights GC 117
	40 lbf·in to 1 000 lbf·ft	0.087 + (0.000 097 TQ) lbf·ft	Torque Arm 48" & Class F weights GC 117
Torque Wrenches FO	10 lbf·in to 100 lbf·in	0.25 + (0.004 04 TQ) lbf·in	Torque Analyzer/Tester
	120 lbf·in to 600 lbf·in	2.8 + (0.000 717 TQ) lbf·in	GC 118
	50 lbf·ft to 250 lbf·ft	0.58 + (0.001 22 TQ) lbf·ft	1
Gas Flow Meters FO	2 sccm to 20 sccm	0.028 sccm + 0.001 sccm/sccm	Fluke-DH
	20 sccm to 200 sccm	0.16 sccm + 0.001 5 sccm/sccm	Molbox RFM-M
	10 sccm to 100 sccm	0.13 sccm + 0.001 sccm/sccm	 Molboc 2E2 Molboc 1SLM
	100 sccm to 1 000 sccm	0.47 sccm + 0.018 sccm/sccm	Molboc 5E3
	50 sccm to 500 sccm	0.59 sccm + 0.1 sccm/sccm	Molboc 10SLM
	500 sccm to 5 000 sccm	1.2 sccm + 0.001 9 sccm/sccm	- GC 121
	100 sccm to 1 000 sccm	1.3 sccm + 0.000 71 sccm/sccm	1
	1 000 sccm to 10 000 sccm	4.5 sccm + 0.019 sccm/sccm	7



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Accreditation is granted to the facility to perform the following calibrations:

Time & Frequency

MEASURED INSTRUMENT, QUANTITY OR GAUGE	RANGE OR NOMINAL DEVICE SIZE AS APPROPRIATE	CALIBRATION AND MEASUREMENT CAPABILITY EXPRESSED AS AN UNCERTAINTY (±)	CALIBRATION EQUIPMENT AND REFERENCE STANDARDS USED
Stopwatches, Timers ^{FO}	Up to 24 hrs	0.059 s/day	Vibrograf Timometer GC 138
Frequency FO	2 Hz to 100 Hz	0.58 Hz + 0.14 uHz/Hz	Fluke 5500 fluke user
	100 Hz to 100 KHz	0.58 Hz + 59 uHz/Hz	manual DUT Manual GC 146
	100 KHz to 2 MHz	0.0 Hz + 1 mHz/Hz	UC 140

Dimensional

MEASURED INSTRUMENT, QUANTITY OR GAUGE	RANGE OR NOMINAL DEVICE SIZE AS APPROPRIATE	CALIBRATION AND MEASUREMENT CAPABILITY EXPRESSED AS AN UNCERTAINTY (±)	CALIBRATION EQUIPMENT AND REFERENCE STANDARDS USED
Calipers ^{FO}	Up to 12 in	290 μin + 2.9 μin/in	Gage Blocks and Plain Ring Gage GC 124
	12 in to 24 in	370 μin + 1.7 μin/in	
	24 in to 60 in	31 μin + 0.5 μin/in	
Micrometers Outside / Inside	Up to 1 in	56 μin + 1.9 μin/in	Gage Blocks GC 164
	1 in to 6 in	51 µin + 3.33 µin/in	
Indicators	Up to 1 in	49 μin + 9 μin/in	Gage Blocks GC 129
Thread Plug Gages ^F Pitch Diameter	Up to 4 in	41 μin + 17 μin/in	Super micrometer, Thread wires and Gage Blocks GC 162
Thread Plug Gages ^F Major Diameter	Up to 4 in	56 μin + 2.3 μin/in	Super micrometer and Gage Blocks GC 162
Gage Block GGG3 & B89 grade 0 ^F	0.1 in to 1 in	2 μin + 3.7 μin/L	Master Gage Blocks And Comparator GC113
	2 mm to 25.4 mm	55 nm + 5.75 nm/L	
	1 in to 7 in	1.2 μin + 5.3 μin/L	
	25 mm to 180 mm	$0.17 \ \mu m + 4.5 \ nm/L$	



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- 1. The CMC (Calibration and Measurement Capability) stated for calibrations included on this scope of accreditation represents the smallest measurement uncertainty attainable by the laboratory when performing a more or less routine calibration of a nearly ideal device under nearly ideal conditions. It is typically expressed at a confidence level of 95 % using a coverage factor k (usually equal to 2). The actual measurement uncertainty associated with a specific calibration performed by the laboratory will typically be larger than the CMC for the same calibration since capability and performance of the device being calibrated and the conditions related to the calibration may reasonably be expected to deviate from ideal to some degree.
- 2. The laboratories range of calibration capability for all disciplines for which they are accredited is the interval from the smallest calibrated standard to the largest calibrated standard used in performing the calibration. The low end of this range must be an attainable value for which the laboratory has or has access to the standard referenced. Verification of an indicated value of zero in the absence of a standard is common practice in the procedure for many calibrations but by its definition it does not constitute calibration of zero capacity.
- 3. The presence of a superscript F means that the laboratory performs calibration of the indicated parameter at its fixed location.
- 4. The presence of a superscript O means that the laboratory performs calibration of the indicated parameter onsite at customer locations.
- 5. The presence of a superscript FO means that the laboratory performs calibration of the indicated parameter both at its fixed location and onsite at customer locations. Example: Outside Micrometer^{FO} would mean that the laboratory performs this calibration at its fixed location and onsite at customer locations.
- 6. Measurement uncertainties obtained for calibrations performed at customer sites can be expected to be larger than the measurement uncertainties obtained at the laboratories fixed location for similar calibrations. This is due to the effects of transportation of the standards and equipment and upon environmental conditions at the customer site which are typically not controlled as closely as at the laboratories fixed location.
- 7. The term T represents temperature in degrees Celsius as appropriate to the uncertainty statement.
- 8. The term P represents pressure in pounds per square inch gage or inches of water column as appropriate to the uncertainty statement.