



PERRY JOHNSON LABORATORY ACCREDITATION, INC.

Certificate of Accreditation

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

Measurement Assurance Technology, LP d/b/a MATsolutions

1600 Corporate Court, Suite 150, Irving, TX 75038

*(Hereinafter called the Organization) and hereby declares that Organization is accredited
in accordance with the recognized International Standard:*

ISO/IEC 17025:2005

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 January 2009):

**Laboratory and Field Calibration of Electrical, Dimensional, Thermodynamic,
Weighing Devices and Pressure**
(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:

DRAFT

Tracy Szerszen
President/Operations Manager

Initial Accreditation Date:

May 4, 2004

Issue Date:

September 26, 2016

Expiration Date:

December 31, 2018

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

Accreditation No.:

68380

Certificate No.:

L16-397

*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: www.pjllabs.com*



Certificate of Accreditation: Supplement

Measurement Assurance Technology, LP d/b/a MATsolutions

1600 Corporate Court, Suite 150, Irving, TX 75038
Contact Name: Patrick Parr Phone: 972-241-2165

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

Dimensional

MEASURED INSTRUMENT, QUANTITY OR GAUGE	RANGE OR NOMINAL DEVICE SIZE AS APPROPRIATE	CALIBRATION AND MEASUREMENT CAPABILITY EXPRESSED AS AN UNCERTAINTY (\pm)	CALIBRATION EQUIPMENT AND REFERENCE STANDARDS USED
Micrometers ^{FO}	1 mm to 304.8 mm (0.05 in to 12 in)	$(3.3 + 0.051L) \mu\text{m}$ [[$(130 + 2L) \mu\text{in}$]]	Gage Blocks
Calipers ^{FO}	1 mm to 304.8 mm (0.05 in to 12 in)	$(21.3 + 0.063L) \mu\text{m}$ [[$(838.6 + 2.5L) \mu\text{in}$]]	
Micrometer End Standards ^F	1 in	15 μin	ULM 600 and Gage Block Set
	2 in to 4 in	18 μin	
	5 in to 8 in	24 μin	
	9 in to 11 in	26 μin	
	12 in	27 μin	
Gage Blocks	0.01 in to 4 in	5.1 μin	Mahr 130B-24

Electrical

MEASURED INSTRUMENT, QUANTITY OR GAUGE	RANGE OR NOMINAL DEVICE SIZE AS APPROPRIATE	CALIBRATION AND MEASUREMENT CAPABILITY EXPRESSED AS AN UNCERTAINTY (\pm)	CALIBRATION EQUIPMENT AND REFERENCE STANDARDS USED
Equipment to Measure DC Voltage ^{FO}	2 μV to 220 mV	7.5 $\mu\text{V/V} + 0.4 \mu\text{V}$	Fluke 5720A
	220 mV to 2.2 V	5.2 $\mu\text{V/V} + 0.7 \mu\text{V}$	
	2.2 V to 11 V	3.5 $\mu\text{V/V} + 2.5 \mu\text{V}$	
	11 V to 22 V	3.5 $\mu\text{V/V} + 4 \mu\text{V}$	
	22 V to 220 V	5 $\mu\text{V/V} + 40 \mu\text{V}$	
	220 V to 1 100 V	6.7 $\mu\text{V/V} + 400 \mu\text{V}$	
Equipment to Output DC Voltage ^{FO}	10 mV to 100 mV	11 $\mu\text{V/V} + 3 \mu\text{V}$	HP 3458A Opt 2
	0.1 V to 1 V	10 $\mu\text{V/V} + 0.3 \mu\text{V}$	
	1 V to 10 V	10 $\mu\text{V/V} + 0.5 \mu\text{V}$	
	10 V to 100 V	12 $\mu\text{V/V} + 30 \mu\text{V}$	
	100 V to 1 000 V	12 $\mu\text{V/V} + 0.1 \text{mV}$	
	0.2 kV to 120 kV	2 mV/V + 10 mV	Ross Engineering VD120-6.2Y-AK-LB-AL



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Equipment to Measure DC Current ^{FO}	0.05 μ A to 220 μ A	11 nA/A + 7.0 nA	Fluke 5720A	
	220 uA to 2.2 mA	81 nA/A + 8.0 nA		
	2.2 mA to 22 mA	800 nA/A + 50 nA		
	22 mA to 220 mA	11 uA/A + 0.8 μ A		
	220 mA to 2.2 A	14 uA/A + 15 μ A		
	Clamp-On Only ^{FO}	2.2 A to 11 A	520 μ A/A + 100 μ A	Fluke 5725A
		3 A to 11 A	0.5 mA/A + 0.5 mA	Fluke 5520A/SC1100
		11 A to 20.5 A	1 mA/A + 0.75 mA	
Equipment to Output DC Current ^{FO}	20 A to 1 000 A	5 mA/A + 0.5 A	Fluke 5520A/SC1100 with 5500/COIL	
	0 μ A to 1 μ A	27 μ A/A + 45 pA	HP 3458A Opt.002	
	1 μ A to 10 μ A	27 μ A/A + 110 pA		
	10 μ A to 100 μ A	27 μ A/A + 900 pA		
	0.1 mA to 1 mA	27 μ A/A + 6 nA		
	1 mA to 10 mA	27 μ A/A + 60 nA		
	10 mA to 100 mA	42 μ A/A + 0.6 μ A		
0.1 A to 1 A	117 μ A/A + 12 μ A			
Equipment to Measure Resistance ^{FO}	0 Ω to 11 Ω	40 μ Ω / Ω + 1 m Ω	Fluke 5520A/SC1100	
	11 Ω to 33 Ω	30 μ Ω / Ω + 1.5 m Ω		
	33 Ω to 110 Ω	28 μ Ω / Ω + 1.4 m Ω		
	110 Ω to 330 Ω	28 μ Ω / Ω + 2 m Ω		
	0.33 k Ω to 1.1 k Ω	28 μ Ω / Ω + 2 m Ω		
	1.1 k Ω to 3.3 k Ω	28 μ Ω / Ω + 20 m Ω		
	3.3 k Ω to 11 k Ω	28 μ Ω / Ω + 20 m Ω		
	11 k Ω to 33 k Ω	28 μ Ω / Ω + 200 m Ω		
	33 k Ω to 110 k Ω	28 μ Ω / Ω + 200 m Ω		
	110 to 330 k Ω	32 μ Ω / Ω + 2 Ω		
	0.33 M Ω to 1.1 M Ω	32 μ Ω / Ω + 2 Ω		
	1.1 M Ω to 3.3 M Ω	60 μ Ω / Ω + 30 Ω		
	3.3 M Ω to 11 M Ω	130 μ Ω / Ω + 50 Ω		
	11 M Ω to 33 M Ω	250 μ Ω / Ω + 2.5 k Ω		
	33 M Ω to 110 M Ω	500 μ Ω / Ω + 3 k Ω		
	110 M Ω to 330 M Ω	0.3 m Ω / Ω + 100 k Ω		
0.33 M Ω to 1 100 M Ω	1.5 m Ω / Ω + 500 k Ω			



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Equipment to Measure Resistance ^{FO}	0 Ω	52 $\mu\Omega$	Fluke 5720A
	1 Ω	22 $\mu\Omega$	
	1.9 Ω	180 $\mu\Omega$	
	10 Ω	230 $\mu\Omega$	
	19 Ω	460 $\mu\Omega$	
	100 Ω	10 $\mu\Omega/\Omega$	
	190 Ω	10 $\mu\Omega/\Omega$	
	1 k Ω	8.7 $\mu\Omega/\Omega$	
	1.9 k Ω	9.0 $\mu\Omega/\Omega$	
	10 k Ω	8.7 $\mu\Omega/\Omega$	
	19 k Ω	8.7 $\mu\Omega/\Omega$	
	100 k Ω	11 $\mu\Omega/\Omega$	
	190 k Ω	12 $\mu\Omega/\Omega$	
	1 M Ω	20 $\mu\Omega/\Omega$	
	1.9 M Ω	12 $\mu\Omega/\Omega$	
	10 M Ω	42 $\mu\Omega/\Omega$	
19 M Ω	50 $\mu\Omega/\Omega$		
100 M Ω	110 $\mu\Omega/\Omega$		
Equipment to Output Resistance ^{FO}	1 Ω to 10 Ω	21 $\mu\Omega/\Omega$ + 60 $\mu\Omega$	HP 3458A Opt. 002
	10 Ω to 100 Ω	18 $\mu\Omega/\Omega$ + 0.6 m Ω	
	0.1 k Ω to 1 k Ω	16 $\mu\Omega/\Omega$ + 0.6 m Ω	
	1 k Ω to 10 k Ω	16 $\mu\Omega/\Omega$ + 6 m Ω	
	10 k Ω to 100 k Ω	16 $\mu\Omega/\Omega$ + 60 m Ω	
	0.1 M Ω to 1 M Ω	21 $\mu\Omega/\Omega$ + 3 Ω	
	1 M Ω to 10 M Ω	73 $\mu\Omega/\Omega$ + 30 Ω	
	10 M Ω to 100 M Ω	600 $\mu\Omega/\Omega$ + 300 Ω	
	100 M Ω to 1 000 M Ω	6 m Ω/Ω + 3 k Ω	



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Equipment to Measure AC Voltage At the listed frequencies ^{FO}			Fluke 5720A
10Hz to 20 Hz	1 μ V to 2.2 mV	1.5 μ V/V + 4 μ V	
20 Hz to 40 Hz	1 μ V to 2.2 mV	1.5 μ V/V + 4 μ V	
40 Hz to 20 kHz	1 μ V to 2.2 mV	1.6 μ V/V + 5 μ V	
20 kHz to 50 kHz	1 μ V to 2.2 mV	2.5 μ V/V + 5 μ V	
50 kHz to 100 kHz	1 μ V to 2.2 mV	2.6 μ V/V + 5 μ V	
100 kHz to 300 kHz	1 μ V to 2.2 mV	3.8 μ V/V + 10 μ V	
300 kHz to 500 kHz	1 μ V to 2.2 mV	5.2 μ V/V + 20 μ V	
500 kHz to 1 MHz	1 μ V to 2.2 mV	9.2 μ V/V + 20 μ V	
Equipment to Measure AC Voltage At the listed frequencies ^{FO}			
10 Hz to 20 Hz	2.2 mV to 22 mV	1.7 μ V/V + 4 μ V	
20 Hz to 40 Hz	2.2 mV to 22 mV	1.6 μ V/V + 4 μ V	
40 Hz to 20 kHz	2.2 mV to 22 mV	2.0 μ V/V + 4 μ V	
20 kHz to 50 kHz	2.2 mV to 22 mV	2.8 μ V/V + 4 μ V	
50 kHz to 100 kHz	2.2 mV to 22 mV	3.9 μ V/V + 5 μ V	
100 kHz to 300 kHz	2.2 mV to 22 mV	8.2 μ V/V + 10 μ V	
300 kHz to 500 kHz	2.2 mV to 22 mV	10 μ V/V + 20 μ V	
500 kHz to 1 MHz	2.2 mV to 22 mV	27 μ V/V + 20 μ V	
Equipment to Measure AC Voltage At the listed frequencies ^{FO}			
10 to 20 Hz	22 mV to 220 mV	26 μ V/V + 12 μ V	
20 Hz to 40 Hz	22 mV to 220 mV	0.9 μ V/V + 7 μ V	
40 Hz to 20 kHz	22 mV to 220 mV	0.99 μ V/V + 7 μ V	
20 kHz to 50 kHz	22 mV to 220 mV	0.63 μ V/V + 7 μ V	
50 kHz to 100 kHz	22 mV to 220 mV	0.49 μ V/V + 17 μ V	
100 kHz to 300 kHz	22 mV to 220 mV	95 μ V/V + 0.2 μ V	
300 kHz to 500 kHz	22 mV to 220 mV	31 μ V/V + 25 μ V	
500 kHz to 1 MHz	22 mV to 220 mV	290 μ V/V + 45 μ V	



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Equipment to Measure AC Voltage At the listed frequencies ^{FO}			Fluke 5720A
10 Hz to 20 Hz	220 mV to 2.2 V	250 μ V/V + 0.4 μ V	
20 Hz to 40 Hz	220 mV to 2.2 V	0.11 μ V/V + 10 μ V	
40 Hz to 20 kHz	220 mV to 2.2 V	0.75 μ V/V + 8 μ V	
20 kHz to 50 kHz	220 mV to 2.2 V	96 μ V/V + 10 μ V	
50 kHz to 100 kHz	220 mV to 2.2 V	130 μ V/V + 30 μ V	
100 kHz to 300 kHz	220 mV to 2.2 V	220 μ V/V + 80 μ V	
300 kHz to 500 kHz	220 mV to 2.2 V	1 mV/V + 200 μ V	
500 kHz to 1 MHz	220 mV to 2.2 V	1.7 mV/V + 300 μ V	
Equipment to Measure AC Voltage At the listed frequencies ^{FO}			
10 Hz to 20 Hz	2.2 V to 22 V	840 μ V/V + 400 μ V	
20 Hz to 40 Hz	2.2 V to 22 V	110 μ V/V + 150 μ V	
40 Hz to 20 kHz	2.2 V to 22 V	74 μ V/V + 50 μ V	
20 kHz to 50 kHz	2.2 V to 22 V	0.96 μ V/V + 100 μ V	
50 kHz to 100 kHz	2.2 V to 22 V	120 μ V/V + 200 μ V	
100 kHz to 300 kHz	2.2 V to 22 V	1.8 mV/V + 600 μ V	
300 kHz to 500 kHz	2.2 V to 22 V	1.0 mV/V + 2 mV	
500 kHz to 1 MHz	2.2 V to 22 V	1.5 mV/V + 3.2 mV	
Equipment to Measure AC Voltage At the listed frequencies ^{FO}			
10 Hz to 20 Hz	22 V to 220 V	26 mV/V + 4 mV	
20 Hz to 40 Hz	22 V to 220 V	1 mV/V + 1.5 mV	
40 Hz to 20 kHz	22 V to 220 V	400 μ V/V + 0.6 mV	
20 kHz to 50 kHz	22 V to 220 V	790 μ V/V + 1.0 mV	
50 kHz to 100 kHz	22 V to 220 V	1.0 mV/V + 2.5 mV	
100 kHz to 300 kHz	22 V to 220 V	1.9 mV/V + 16 mV	
300 kHz to 500 kHz	22 V to 220 V	3.7 mV/V + 40 mV	
500 kHz to 1 MHz	22 V to 220 V	6.9 mV/V + 80 mV	
Equipment to Measure AC Voltage At the listed frequencies ^{FO}			
15 Hz to 50 Hz	220 V to 1 100 V	2.1 mV/V + 16 mV	
50 Hz to 1 kHz	220 V to 1 100 V	2.2 mV/V + 3.5 mV	



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Equipment to Measure AC Voltage At the listed frequencies ^{FO}			Fluke 5720A
30 kHz to 50 kHz	220 V to 750 V	450 mV/V + 11 mV	
50 kHz to 100 kHz	220 V to 750 V	4.5 mV/V + 45 mV	
Equipment to Measure AC Voltage At the listed frequencies ^{FO}			
40 Hz to 1 kHz	750 V to 1 100 V	4.2 mV/V + 4 mV	
1 kHz to 20 kHz	750 V to 1 100 V	2.2 mV/V + 6 mV	
20 kHz to 30 kHz	750 V to 1 100 V	2.6 mV/V + 11 mV	
Equipment to Output AC Voltage (At the listed frequencies) ^{FO}			Ross Engineering VD120-6.2Y-AK-LB-AL
50 Hz to 60 Hz	0.2 kV to 120 kV	6 mV/V + 10 mV	
Equipment to Output AC Voltage (At the listed frequencies) ^{FO}			HP 3458A Opt. 002
1 Hz to 40 Hz	1 mV to 10 mV	0.4 mV/V + 5 μ V	
40 Hz to 1 kHz	1 mV to 10 mV	0.3 mV/V + 4 μ V	
1 kHz to 20 kHz	1 mV to 10 mV	0.4 mV/V + 4 μ V	
20 kHz to 50 kHz	1 mV to 10 mV	1.1 mV/V + 4 μ V	
50 kHz to 100 kHz	1 mV to 10 mV	5.5 mV/V + 4 μ V	
100 kHz to 300 kHz	1 mV to 10 mV	45 mV/V + 4 μ V	
Equipment to Output AC Voltage (At the listed frequencies) ^{FO}			
1 Hz to 40 Hz	10 mV to 100 mV	0.1 mV/V + 4 μ V	
40 Hz to 1 kHz	10 mV to 100 mV	0.1 mV/V + 2 μ V	
1 kHz to 20 kHz	10 mV to 100 mV	0.15 mV/V + 2 μ V	
20 kHz to 50 kHz	10 mV to 100 mV	0.4 mV/V + 2 μ V	
50 kHz to 100 kHz	10 mV to 100 mV	0.9 mV/V + 2 μ V	
100 kHz to 300 kHz	10 mV to 100 mV	3.5 mV/V + 10 μ V	
300 kHz to 1 MHz	10 mV to 100 mV	11 mV/V + 10 μ V	
1 MHz to 2 MHz	10 mV to 100 mV	16 mV/V + 10 μ V	



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Equipment to Output AC Voltage (At the listed frequencies) ^{FO}			HP 3458A Opt. 002
1 Hz to 40 Hz	0.1 V to 1 V	0.1 mV/V + 4 μ V	
40 Hz to 1 kHz	0.1 V to 1 V	0.1 mV/V + 2 μ V	
1 kHz to 20 kHz	0.1 V to 1 V	0.15 mV/V + 2 μ V	
20 kHz to 50 kHz	0.1 V to 1 V	0.4 mV/V + 2 μ V	
50 kHz to 100 kHz	0.1 V to 1 V	0.9 mV/V + 2 μ V	
100 kHz to 300 kHz	0.1 V to 1 V	3.5 mV/V + 10 μ V	
300 kHz to 1 MHz	0.1 V to 1 V	11 mV/V + 10 μ V	
1 MHz to 2 MHz	0.1 V to 1 V	16 mV/V + 10 μ V	
Equipment to Output AC Voltage (At the listed frequencies) ^{FO}			
1 Hz to 40 Hz	1 V to 10 V	0.1 mV/V + 4 μ V	
40 Hz to 1 kHz	1 V to 10 V	0.1 mV/V + 2 μ V	
1 kHz to 20 kHz	1 V to 10 V	0.15 mV/V + 2 μ V	
20 kHz to 50 kHz	1 V to 10 V	0.4 mV/V + 2 μ V	
50 kHz to 100 kHz	1 V to 10 V	0.9 mV/V + 2 μ V	
100 kHz to 300 kHz	1 V to 10 V	3.5 mV/V + 10 μ V	
300 kHz to 1 MHz	1 V to 10 V	11 mV/V + 10 μ V	
1 MHz to 2 MHz	1 V to 10 V	16 mV/V + 10 μ V	
Equipment to Output AC Voltage (At the listed frequencies) ^{FO}			
1 Hz to 40 Hz	10 V to 100 V	0.3 mV/V + 4 mV	
40 Hz to 1 kHz	10 V to 100 V	0.2 mV/V + 2 mV	
1 kHz to 20 kHz	10 V to 100 V	0.2 mV/V + 2 mV	
20 kHz to 50 kHz	10 V to 100 V	0.4 mV/V + 2 mV	
50 kHz to 100 kHz	10 V to 100 V	1.5 mV/V + 2 mV	
100 kHz to 300 kHz	10 V to 100 V	4 mV/V + 10 mV	
300 kHz to 1 MHz	10 V to 100 V	15 mV/V + 10 mV	



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Equipment to Output AC Voltage (At the listed frequencies) ^{FO}				
1 Hz to 40 Hz	100 V to 1 000 V	0.5 mV/V + 40 mV	HP 3458A Opt. 002	
40 Hz to 1 kHz	100 V to 1 000 V	0.5 mV/V + 20 mV		
1 kHz to 20 kHz	100 V to 1 000 V	0.7 mV/V + 20 mV		
20 kHz to 50 kHz	100 V to 1 000 V	1.5 mV/V + 20 mV		
50 kHz to 100 kHz	100 V to 1 000 V	4 mV/V + 20 mV		
Equipment to Measure AC Current (At the listed frequencies) ^{FO}				
10 Hz to 20 Hz	1 μ A to 220 μ A	61 nA/A + 0.19 nA	Fluke 5720A	
20 Hz to 40 Hz	1 μ A to 220 μ A	40 nA/A + 0.1 nA		
40 Hz to 1 kHz	1 μ A to 220 μ A	32 nA/A + 8 nA		
1 kHz to 5 kHz	1 μ A to 220 μ A	69 nA/A + .12 nA		
5 kHz to 10 kHz	1 μ A to 220 μ A	250 nA/A + 0.65 nA		
Equipment to Measure AC Current (At the listed frequencies) ^{FO}				
10 Hz to 20 Hz	220 μ A to 2.2 mA	510 nA/A + 0.4 nA		
20 Hz to 40 Hz	220 μ A to 2.2 mA	330 nA/A + 0.35 nA		
40 Hz to 1 kHz	220 μ A to 2.2 mA	270 nA/A + 0.25 nA		
1 kHz to 5 kHz	220 μ A to 2.2 mA	430 nA/A + 0.1 nA		
5 kHz to 10 kHz	220 μ A to 2.2 mA	220 uA/A + 0.1 nA		
Equipment to Measure AC Current (At the listed frequencies) ^{FO}				
10 Hz to 20 Hz	2.2 mA to 22 mA	5.2 μ A/A + 400 nA		
20 Hz to 40 Hz	2.2 mA to 22 mA	3.3 μ A/A + 350 nA		
40 Hz to 1 kHz	2.2 mA to 22 mA	2.6 μ A/A + 350 nA		
1 kHz to 5 kHz	2.2 mA to 22 mA	4.2 μ A/A + 550 nA		
5 kHz to 10 kHz	2.2 mA to 22 mA	22 μ A/A + 5 μ A		
Equipment to Measure AC Current (At the listed frequencies) ^{FO}				
10 Hz to 20 Hz	22 mA to 220 mA	52 μ A/A + 400 nA		
20 Hz to 40 Hz	22 mA to 220 mA	33 μ A/A + 3.5 μ A		
40 Hz to 1 kHz	22 mA to 220 mA	27 μ A/A + 2.5 μ A		
1 kHz to 5 kHz	22 mA to 220 mA	43 μ A/A + 3.5 μ A		
5 kHz to 10 kHz	22 mA to 220 mA	220 μ A/A + 10 μ A		



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Equipment to Measure AC Current (At the listed frequencies) ^{FO}				
20 Hz to 1 kHz	220 mA to 2.2 A	55 μ A/A + 0.35 μ A	Fluke 5720A	
1 kHz to 5 kHz	220 mA to 2.2 A	0.93 mA/A + 80 μ A		
5 kHz to 10 kHz	220 mA to 2.2 A	14 mA/A + 160 μ A		
Equipment to Measure AC Current (At the listed frequencies) ^{FO}				
40 to 1 kHz	2.2 A to 11 A	0.95 mA/A + 100 μ A	Fluke 5725A	
1 kHz to 5 kHz	2.2 A to 11 A	1.3 mA/A + 100 μ A		
5 kHz to 10 kHz	2.2 A to 11 A	1.4 mA/A + 100 μ A		
Equipment to Measure AC Current (At the listed frequencies) ^{FO}				
45 Hz to 100 Hz	11 A to 20.5 A	1.2 mA/A + 5 mA	Fluke 5520A	
100 Hz to 1 kHz	11 A to 20.5 A	1.5 mA/A + 5 mA		
1 kHz to 5 kHz	11 A to 20.5 A	30 mA/A + 5 mA		
Equipment to Output AC Current (At the listed frequencies) ^{FO}				
10 Hz to 20 Hz	5 μ A to 100 μ A	4.1 mA/A + 0.04 μ A	HP 3458A Opt. 002	
20 Hz to 45 Hz	5 μ A to 100 μ A	1.6 mA/A + 0.04 μ A		
45 Hz to 100 Hz	5 μ A to 100 μ A	0.7 mA/A + 0.04 μ A		
100 Hz to 5 kHz	5 μ A to 100 μ A	0.7 mA/A + 0.04 μ A		
Equipment to Output AC Current (At the listed frequencies) ^{FO}				
10 Hz to 20 Hz	0.1 mA to 1 mA	4.1 mA/A + 0.2 μ A		
20 Hz to 45 Hz	0.1 mA to 1 mA	1.6 mA/A + 0.2 μ A		
45 Hz to 100 Hz	0.1 mA to 1 mA	0.7 mA/A + 0.2 μ A		
100 Hz to 5 kHz	0.1 mA to 1 mA	0.4 mA/A + 0.2 μ A		
5 kHz to 20 kHz	0.1 mA to 1 mA	0.7 mA/A + 0.2 μ A		
Equipment to Output AC Current (At the listed frequencies) ^{FO}				
10 Hz to 20 Hz	1 mA to 10 mA	4.1 mA/A + 0.2 μ A		
20 Hz to 45 Hz	1 mA to 10 mA	1.6 mA/A + 0.2 μ A		
45 Hz to 100 Hz	1 mA to 10 mA	0.7 mA/A + 0.2 μ A		
100 Hz to 5 kHz	1 mA to 10 mA	0.4 mA/A + 0.2 μ A		
5 kHz to 20 kHz	1 mA to 10 mA	0.7 mA/A + 0.2 μ A		



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Measurement Assurance Technology, LP d/b/a MATsolutions

1600 Corporate Court, Suite 150, Irving, TX 75038
Contact Name: Patrick Parr Phone: 972-241-2165

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

Electrical

MEASURED INSTRUMENT, QUANTITY OR GAUGE	RANGE OR NOMINAL DEVICE SIZE AS APPROPRIATE	CALIBRATION AND MEASUREMENT CAPABILITY EXPRESSED AS AN UNCERTAINTY (\pm)	CALIBRATION EQUIPMENT AND REFERENCE STANDARDS USED
Equipment to Output AC Current (At the listed frequencies) ^{FO}			HP 3458A Opt. 002
10 Hz to 20 Hz	10 mA to 100 mA	4.1 mA/A + 0.2 μ A	
20 Hz to 45 Hz	10 mA to 100 mA	0.7 mA/A + 0.2 μ A	
45 Hz to 100 Hz	10 mA to 100 mA	0.7 mA/A + 0.2 μ A	
100 Hz to 5 kHz	10 mA to 100 mA	0.7 mA/A + 0.2 μ A	
5 kHz to 20 kHz	10 mA to 100 mA	0.7 mA/A + 0.2 μ A	
Equipment to Output AC Current (At the listed frequencies) ^{FO}			
10 Hz to 20 Hz	0.1 A to 1 A	1.7 mA/A + 0.2 mA	
20 Hz to 45 Hz	0.1 A to 1 A	0.9 mA/A + 0.2 mA	
45 Hz to 100 Hz	0.1 A to 1 A	1.1 mA/A + 0.2 mA	
100 Hz to 5 kHz	0.1 A to 1 A	3.1 mA/A + 0.2 mA	
5 kHz to 20 kHz	0.1 A to 1 A	10 mA/A + 0.4 mA	
Equipment to Measure Capacitance (At the listed frequencies) ^{FO}			Fluke 5520A/SC1100
10 Hz to 10 kHz	0.19 nF to 0.4 nF	5 mF/F + 10 pF	
	0.4 nF to 1.1 nF	5 mF/F + 10 pF	
Equipment to Measure Capacitance (At the listed frequencies) ^{FO}			
10 Hz to 3 kHz	1.1 nF to 3.3 nF	5 mF/F + 10 pF	
Equipment to Measure Capacitance (At the listed frequencies) ^{FO}			
10 Hz to 1 kHz	3.3 nF to 11 nF	2.5 mF/F + 10 pF	
	11 nF to 33 nF	2.5 mF/F + 100 pF	
	33 nF to 110 nF	2.5 mF/F + 100 pF	
	110 nF to 330 nF	2.5 mF/F + 300 pF	
Equipment to Measure Capacitance (At the listed frequencies) ^{FO}			
10 Hz to 600 Hz	0.33 μ F to 1.1 μ F	2.5 mF/F + 1 nF	
10 Hz to 300 Hz	1.1 μ F to 3.3 μ F	2.5 mF/F + 3 nF	
10 Hz to 150 Hz	3.3 μ F to 11 μ F	2.5 mF/F + 10 nF	
10 Hz to 120 Hz	11 μ F to 33 μ F	4 mF/F + 30 nF	
10 Hz to 80 Hz	33 μ F to 110 μ F	4.5 mF/F + 100 nF	



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Equipment to Measure Capacitance (At the listed frequencies) ^{FO}			
Up to 50 Hz	110 μ F to 330 μ F	4.5 mF/F + 300 nF	Fluke 5520A/SC1100
Up to 20 Hz	0.33 mF to 1.1 mF	4.5 mF/F + 1 μ F	
Up to 6 Hz	1.1 mF to 3.3 mF	4.5 mF/F + 3 μ F	
Up to 2 Hz	3.3 mF to 11 mF	4.5 mF/F + 10 μ F	
Up to 0.6 Hz	11 mF to 33 mF	7.5 mF/F + 30 μ F	
Up to 0.2 Hz	33 mF to 100 mF	11 mF/F + 100 μ F	
Temperature Calibration, Indication, and Control Equipment used with Thermocouple Type B ^{FO}	600 °C to 800 °C	0.44 °C	Electrical Simulation of Thermocouple Output Fluke 5520A/SC1100
	800 °C to 1 000 °C	0.34 °C	
	1 000 °C to 1 550 °C	0.3 °C	
	1 550 °C to 1 820 °C	0.33 °C	
Temperature Calibration, Indication, and Control Equipment used with Thermocouple Type C ^{FO}	0 °C to 150 °C	0.3 °C	
	150 °C to 650 °C	0.26 °C	
	650 °C to 1 000 °C	0.31 °C	
	1 000 °C to 1 800 °C	0.5 °C	
	1 800 °C to 2 316 °C	0.84 °C	
Temperature Calibration, Indication, and Control Equipment used with Thermocouple Type E ^{FO}	-250 °C to -100 °C	0.5 °C	
	-100 °C to -25 °C	0.16 °C	
	-25 °C to 120 °C	0.14 °C	
	120 °C to 410 °C	0.16 °C	
	410 °C to 1 300 °C	0.21 °C	
Temperature Calibration, Indication, and Control Equipment used with Thermocouple Type J ^{FO}	-210 °C to -100 °C	0.27 °C	
	-100 °C to -30 °C	0.16 °C	
	-30 °C to 150 °C	0.14 °C	
	150 °C to 760 °C	0.17 °C	
	760 °C to 1 200 °C	0.23 °C	
Temperature Calibration, Indication, and Control Equipment used with Thermocouple Type K ^{FO}	-200 °C to -100 °C	0.33 °C	
	-100 °C to -25 °C	0.18 °C	
	-25 °C to 120 °C	0.16 °C	
	120 °C to 1 000 °C	0.26 °C	
	1 000 °C to 1 372 °C	0.4 °C	



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Temperature Calibration, Indication, and Control Equipment used with Thermocouple Type L ^{FO}	-200 °C to -100 °C	0.37 °C	Electrical Simulation of Thermocouple Output Fluke 5520A/SC1100
	-100 °C to 800 °C	0.26 °C	
	800 °C to 900 °C	0.17 °C	
Temperature Calibration, Indication, and Control Equipment used with Thermocouple Type N ^{FO}	-250 °C to -100 °C	0.4 °C	
	-100 °C to -25 °C	0.22 °C	
	-25 °C to 120 °C	0.19 °C	
	120 °C to 410 °C	0.18 °C	
	410 °C to 1 300 °C	0.27 °C	
Temperature Calibration, Indication, and Control Equipment used with Thermocouple Type R ^{FO}	0 °C to 250 °C	0.57 °C	
	250 °C to 400 °C	0.35 °C	
	400 °C to 1 000 °C	0.33 °C	
	1 000 °C to 1 767 °C	0.4 °C	
Temperature Calibration, Indication, and Control Equipment used with Thermocouple Type S ^{FO}	0 °C to 250 °C	0.47 °C	
	250 °C to 1 000 °C	0.36 °C	
	1 000 °C to 1 400 °C	0.37 °C	
	1 400 °C to 1 767 °C	0.46 °C	
Temperature Calibration, Indication, and Control Equipment used with Thermocouple Type T ^{FO}	-250 °C to -150 °C	0.63 °C	
	-150 °C to 0 °C	0.24 °C	
	0 °C to 120 °C	0.16 °C	
	120 °C to 400 °C	0.14 °C	

Mass, Force, and Weighing Devices

MEASURED INSTRUMENT, QUANTITY OR GAUGE	RANGE OR NOMINAL DEVICE SIZE AS APPROPRIATE	CALIBRATION AND MEASUREMENT CAPABILITY EXPRESSED AS AN UNCERTAINTY (\pm)	CALIBRATION EQUIPMENT AND REFERENCE STANDARDS USED
Scales/Balances ^{FO}	1 mg to 500 mg	0.02 mg	Class 1 Weights
	1 g to 10 g	0.1 mg	
	20 g to 50 g	0.25 mg	
	100 g to 500 g	2.4 mg	
	0.5 lb to 150 lb	0.031 lb	



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Mechanical

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Pressure Gauges ^{FO}	0.3 psi to 300 psi	0.097 psi	Fluke 700P27
	0.005 psi to 1 psi	0.001 5 psi	Fluke 700P02

Thermodynamic

MEASURED INSTRUMENT, QUANTITY OR GAUGE	RANGE OR NOMINAL DEVICE SIZE AS APPROPRIATE	CALIBRATION AND MEASUREMENT CAPABILITY EXPRESSED AS AN UNCERTAINTY (\pm)	CALIBRATION EQUIPMENT AND REFERENCE STANDARDS USED
Temperature & Humidity Measuring Devices ^F	0 °C to 70 °C	0.067 °C	Thunder Scientific B2500
	10 % RH to 90 % RH	1.3 % RH	
Temperature Measuring Devices ^{FO}	-95°C to 140 °C	0.031 °C	Fluke 9190A
	-139 °F to 284 °F	0.059 °F	

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. Example: Outside Micrometer ^F would mean that the laboratory performs this calibration at its fixed location.
4. 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.



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

5. 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.
6. The term L represents length in inches or millimeters as appropriate to the uncertainty statement.

