

PERRY JOHNSON LABORATORY ACCREDITATION, INC.

Certificate of Accreditation

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

**AcuCal Labs
14000 Pecan Park Road
Jacksonville, FL 32218**

(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-FLAC-IAF Communiqué dated January 2009):

**Calibration of Electrical, Thermodynamic, Mechanical,
Dimensional and Weighing Devices in the
Lab and Controlled Field Site Calibrations
(As detailed in the supplement)**

Such testing and/or calibration services shall only be offered at or from the address given above. 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:

The validity of this certificate is mandated through ongoing surveillance.

Tracy Szerszen
President/Operations Manager

Perry Johnson Laboratory
Accreditation, Inc. (PJLA)
26555 Evergreen, Suite 1325
Southfield, Michigan 48076

Initial Accreditation Date:
February 14, 2009

Issue Date:
February 14, 2009

Expiration Date:
February 13, 2011

Accreditation No.
60048

Certificate No.
L09-7

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Certificate of Accreditation: Supplement

AcuCal Labs
14000 Pecan Park Road
Jacksonville, FL 32218

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

Electrical

MEASURED INSTRUMENT, QUANTITY OR GAUGE	RANGE (AND SPECIFICATION WHERE APPROPRIATE)	BEST MEASUREMENT CAPABILITY EXPRESSED AS AN UNCERTAINTY (\pm)	REMARKS
DC Voltage- Generate	0 mV to 329.999 9 mV	20 μ V/V + 1 μ V	Fluke 5520A
	0 V to 3.299 99 V	11 μ V/V + 2 μ V	
	0 V to 32.999 99 V	12 μ V/V + 20 μ V	
	30 V to 329.999 9 V	18 μ V/V + 150 μ V	
	100 V to 1 000.000 V	18 μ V/V + 1.5 mV	
DC Voltage- Measure	200 mV	5.0 μ V/V + 0.5 μ V	Fluke 8508A
	2 V	3.5 μ V/V + 0.2 μ V	
	20 V	3.5 μ V/V + 0.2 μ V	
	200 V	5.5 μ V/V + 0.2 μ V	
	1 000 V	5.5 μ V/V + 0.5 μ V	
DC Current – Generate	0 μ A to 329.999 9 μ A	0.15 mA/A + 0.02 μ A	Fluke 5520A
	0 mA to 3.299 99 mA	0.10 mA/A + 0.05 μ A	
	0 mA to 32.999 9 mA	0.10 mA/A + 0.25 μ A	
	0 mA to 329.999 mA	0.10 mA/A + 2.5 μ A	
	0 A 1.099 99 A	0.20 mA/A + 40 μ A	
	1.1 ADC to 2.999 99 A	0.38 mA/A + 40 μ A	
	0 A to 10.999 9 A	0.50 mA/A + 500 μ A	
	11 A to 20.5 A	1.0 mA/A + 750 μ A	
DC Current- Measure	200 μ A	12 μ A/A + 2 μ A	Fluke 8508A
	2 mA	12 μ A/A + 2 μ A	
	20 mA	14 μ A/A + 2 μ A	
	200 mA	48 μ A/A + 4 μ A	
	2 A	185 μ A/A + 8 μ A	
	20 A	0.4 mA/A + 20 μ A	
AC Voltage – Generate At the listed frequencies			Fluke 5520A
	10 Hz to 45 Hz	0.80 mV/V + 6 μ V	
	45 Hz to 10 kHz	0.15 mV/V + 6 μ V	
	10 kHz to 20 kHz	0.20 mV/V + 6 μ V	
	20 kHz to 50 kHz	1.0 mV/V + 6 μ V	
	50 kHz to 100 kHz	3.5 mV/V + 12 μ V	
	100 kHz to 500 kHz	8.0 mV/V + 50 μ V	

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AC Voltage- Generate At the listed frequencies			Fluke 5520A
10 Hz to 45 Hz	33 mV to 329.999 mV	0.30 mV/V + 8 μ V	
45 Hz to 10 kHz	33 mV to 329.999 mV	0.15 mV/V + 8 μ V	
10 kHz to 20 kHz	33 mV to 329.999 mV	0.16 mV/V + 8 μ V	
20 kHz to 50 kHz	33 mV to 329.999 mV	0.35 mV/V + 8 μ V	
50 kHz to 100 kHz	33 mV to 329.999 mV	0.80 mV/V + 32 μ V	
100 kHz to 500 kHz	33 mV to 329.999 mV	2.0 mV/V + 70 μ V	
AC Voltage- Generate At the listed frequencies			
10 Hz to 45 Hz	0.33 V to 3.299 99 V	0.30 mV/V + 50 μ V	
45 Hz to 10 kHz	0.33 V to 3.299 99 V	0.15 mV/V + 60 μ V	
10 kHz to 20 kHz	0.33 V to 3.299 99 V	0.19 mV/V + 60 μ V	
20 kHz to 50 kHz	0.33 V to 3.299 99 V	0.30 mV/V + 50 μ V	
50 kHz to 100 kHz	0.33 V to 3.299 99 V	0.70 mV/V + 130 μ V	
100 kHz to 500 kHz	0.33 V to 3.299 99 V	2.4 mV/V + 600 μ V	
AC Voltage- Generate At the listed frequencies			
10 Hz to 45 Hz	3.3 V to 32.999 9 V	0.30 mV/V + 650 μ V	
45 Hz to 10 kHz	3.3 V to 32.999 9 V	1.50 mV/V + 600 μ V	
10 kHz to 20 kHz	3.3 V to 32.999 9 V	0.24 mV/V + 600 μ V	
20 kHz to 50 kHz	3.3 V to 32.999 9 V	0.35 mV/V + 600 μ V	
50 kHz to 100 kHz	3.3 V to 32.999 9 V	0.90 mV/V + 1.6 mV	
AC Voltage- Generate At the listed frequencies			
10 Hz to 45 Hz	33 V to 329.999 V	0.19 mV/V + 2.0 mV	
45 Hz to 10 kHz	33 V to 329.999 V	0.20 mV/V + 6.0 mV	
10 kHz to 20 kHz	33 V to 329.999 V	0.25 mV/V + 6.0 mV	
20 kHz to 50 kHz	33 V to 329.999 V	0.30 mV/V + 6.0 mV	
50 kHz to 100 kHz	33 V to 329.999 V	2.0 mV/V + 50.0 mV	

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AC Voltage – Generate At the listed frequencies			Fluke 5520A
45 Hz to 1 kHz	330 V to 1020 V	0.30 mV/V + 10 mV	
1 kHz to 5 kHz	330 V to 1020 V	0.25 mV/V + 10 mV	
5 kHz to 10 kHz	330 V to 1020 V	0.30 mV/V + 10 mV	
AC Voltage- Measure At the listed frequencies			Fluke 8508A
1 Hz to 10 Hz	0 mV to 200 mV	0.165 mV/V + 70 μ V	
10 Hz to 40 Hz	0 mV to 200 mV	0.140 mV/V + 20 μ V	
40 Hz to 100 Hz	0 mV to 200 mV	0.115 mV/V + 20 μ V	
100 Hz to 2 kHz	0 mV to 200 mV	0.110 mV/V + 10 μ V	
2 kHz to 10 kHz	0 mV to 200 mV	0.135 mV/V + 20 μ V	
10 kHz to 30 kHz	0 mV to 200 mV	0.340 mV/V + 40 μ V	
30 kHz to 100 kHz	0 mV to 200 mV	0.765 mV/V + 0.10 μ V	
AC Voltage – Measure At the listed frequencies			
1 Hz to 10 Hz	200 mV to 2 V	0.15 mV/V + 120 μ V	
10 Hz to 40 Hz	200 mV to 2 V	0.115 mV/V + 20 μ V	
40 Hz to 100 Hz	200 mV to 2 V	0.09 mV/V + 20 μ V	
100 Hz to 2 kHz	200 mV to 2 V	0.075 mV/V + 20 μ V	
2 kHz to 10 kHz	200 mV to 2 V	0.11 mV/V + 20 μ V	
10 kHz to 30 kHz	200 mV to 2 V	0.22 mV/V + 40 μ V	
30 kHz to 100 kHz	200 mV to 2 V	0.57 mV/V + 200 μ V	
100 kHz to 300 kHz	200 mV to 2 V	3.0 mV/V + 2 mV	
300 kHz to 1 MHz	200 mV to 2 V	.057 mV/V + 20 mV	
AC Voltage – Measure At the listed frequencies			
1 Hz to 10 Hz	2 V to 20 V	0.15 mV/V + 1.2 mV	
10 Hz to 40 Hz	2 V to 20 V	0.115 mV/V + 200 μ V	
40 Hz to 100 Hz	2 V to 20 V	0.09 mV/V + 200 μ V	
100 Hz to 2 kHz	2 V to 20 V	0.075 mV/V + 200 μ V	
2 kHz to 10 kHz	2 V to 20 V	0.11 mV/V + 200 μ V	
10 kHz to 30 kHz	2 V to 20 V	0.22 mV/V + 400 μ V	
30 kHz to 100 kHz	2 V to 20 V	0.57 mV/V + 2 mV	

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AC Voltage – Measure At the listed frequencies			Fluke 8508A
100 kHz to 300 kHz	2 V to 20 V	3.0 mV/V + 20 mV	
300 kHz to 1 MHz	2 V to 20 V	20 mV/V + 200 mV	
AC Voltage- Measure At the listed frequencies			
1 Hz to 10 Hz	200 V to 1000 V	0.15 mV/V + 70 mV	
10 Hz to 40 Hz	200 V to 1000 V	0.12 mV/V + 20 mV	
40 Hz to 100 Hz	200 V to 1000 V	0.115 mV/V + 20 mV	
10 kHz to 30 kHz	200 V to 1000 V	0.225 mV/V + 40 mV	
30 kHz to 100 kHz	200 V to 1000 V	0.58 mV/V + 200 mV	
AC Current- Generate At the listed frequencies			
10 Hz to 20 Hz	29.00 μ A to 329.99 μ A	2.0 mA/A + 0.1 μ A	
20 Hz to 45 Hz	29.00 μ A to 329.99 μ A	1.5 mA/A + 0.1 μ A	
45 Hz to 1 kHz	29.00 μ A to 329.99 μ A	1.25 mA/A + 0.1 μ A	
1 kHz to 5 kHz	29.00 μ A to 329.99 μ A	3.0 mA/A + 0.15 μ A	
5 kHz to 10 kHz	29.00 μ A to 329.99 μ A	8.0 mA/A + 0.2 μ A	
10 kHz to 30 kHz	29.00 μ A to 329.99 μ A	16 mA/A + 0.4 μ A	
AC Current- Generate At the listed frequencies			
10 Hz to 20 Hz	0.33 mA to 3.299 9 mA	2.0 mA/A + 0.15 μ A	
20 Hz to 45 Hz	0.33 mA to 3.299 9 mA	1.25 mA/A + 0.15 μ A	
45 Hz to 1 kHz	0.33 mA to 3.299 9 mA	1.0 mA/A + 0.15 μ A	
1 kHz to 5 kHz	0.33 mA to 3.299 9 mA	2.0 mA/A + 0.2 μ A	
5 kHz to 10 kHz	0.33 mA to 3.299 9 mA	5.0 mA/A + 0.3 μ A	
10 kHz to 30 kHz	0.33 mA to 3.299 9 mA	10 mA/A + 0.6 μ A	
AC Current –Generate At the listed frequencies			
10 Hz to 20 Hz	3.3 mA to 32.999 mA	1.8 mA/A + 2 μ A	
20 Hz to 45 Hz	3.3 mA to 32.999 mA	0.9 mA/A + 2 μ A	
45 Hz to 1 kHz	3.3 mA to 32.999 mA	0.4 mA/A + 2 μ A	
1 kHz to 5 kHz	3.3 mA to 32.999 mA	0.8 mA/A + 2 μ A	
5 kHz to 10 kHz	3.3 mA to 32.999 mA	2.0 mA/A + 3 μ A	
10 kHz to 30 kHz	3.3 mA to 32.999 mA	4.0 mA/A + 4 μ A	

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AC Current- Generate At the listed frequencies			Fluke 5520A
10 Hz to 20 Hz	33 mA to 329.99 mA	1.8 mA/A + 20 μ A	
20 Hz to 45 Hz	33 mA to 329.99 mA	0.9 mA/A + 20 μ A	
45 Hz to 1 kHz	33 mA to 329.99 mA	0.4 mA/A + 20 μ A	
1 kHz to 5 kHz	33 mA to 329.99 mA	1.0 mA/A + 50 μ A	
5 kHz to 10 kHz	33 mA to 329.99 mA	2.0 mA/A + 100 μ A	
10 kHz to 30 kHz	33 mA to 329.99 mA	4.0 mA/A + 200 μ A	
AC Current- Generate At the listed frequencies			
10 Hz to 45 Hz	0.33 A to 1.099 99 A	1.8 mA/A + 100 μ A	
45 Hz to 1 kHz	0.33 A to 1.099 99 A	0.5 mA/A + 100 μ A	
1 kHz to 5 kHz	0.33 A to 1.099 99 A	6.0 mA/A + 1.0 mA	
5 kHz to 10 kHz	0.33 A to 1.099 99 A	25 mA/A + 5.0 mA	
AC Current- Generate At the listed frequencies			
10 Hz to 45 Hz	1.1 A to 2.999 99 A	1.8 mA/A + 100 μ A	
45 Hz to 1 kHz	1.1 A to 2.999 99 A	0.6 mA/A + 100 μ A	
1 kHz to 5 kHz	1.1 A to 2.999 99 A	6.0 mA/A + 1.0 mA	
5 kHz to 10 kHz	1.1 A to 2.999 99 A	25 mA/A + 5.0 mA	
AC Current – Generate At the listed frequencies			
45 Hz to 100 Hz	3 A to 10.999 99A	0.6 mA/A + 2.0 mA	
100 Hz to 1 kHz	3 A to 10.999 99A	1.0 mA/A + 2.0 mA	
1 kHz to 5 kHz	3 A to 10.999 99A	30 mA/A + 2.0 mA	
AC Current – Generate			
45 Hz to 100 Hz	11 A to 20.5 A	1.2 mA/A + 5.0 mA	
100 Hz to 1 kHz	11 A to 20.5 A	1.5 mA/A + 5.0 mA	
1 kHz to 5 kHz	11 A to 20.5 A	31 mA/A + 5.0 mA	
AC Current- Measure At the listed frequencies			Fluke 8508A
1 Hz to 10 Hz	0 μ A to 200 μ A	0.5 mA/A + 0.02 μ A	
10 Hz to 10 kHz	0 μ A to 200 μ A	0.5 mA/A + 0.02 mA	
10 kHz to 30 kHz	0 μ A to 200 μ A	0.71 mA/A + 0.02 mA	
30 kHz to 100 kHz	0 μ A to 200 μ A	4.0 mA/A + 0.02 mA	

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AC Current- Measure At the listed frequencies			Fluke 8508A
1 Hz to 10 Hz	200 μ A to 2 mA	0.31mA/A + 0.2 μ A	
10 Hz to 10 kHz	200 μ A to 2 mA	0.30 mA/A + 0.2 μ A	
10 kHz to 30 kHz	200 μ A to 2 mA	0.71 mA/A + 0.2 μ A	
30 kHz to 100 kHz	200 μ A to 2 mA	4.0 mA/A + 0.2 μ A	
AC Current- Measure At the listed frequencies			
1 Hz to 10 Hz	2 mA to 20 mA	0.31mA/A + 2 μ A	
10 Hz to 10 kHz	2 mA to 20 mA	0.30 mA/A + 2 μ A	
10 kHz to 30 kHz	2 mA to 20 mA	0.71 mA/A + 2 μ A	
30 kHz to 100 kHz	2 mA to 20 mA	4.0 mA/A + 2 μ A	
AC Current – Measure At the listed frequencies			
1 Hz to 10 Hz	20 mA to 200 mA	0.31 mA/A + 20 μ A	
10 Hz to 10 kHz	20 mA to 200 mA	0.29 mA/A + 20 μ A	
10 kHz to 30 kHz	20 mA to 200 mA	0.625 mA/A + 20 μ A	
AC Current- Measure At the listed frequencies			
10 Hz to 2 kHz	200 mA to 2 A	0.62 mA/A + 0.20 mA	
2 kHz to 10 kHz	200 mA to 2 A	0.735 mA/A + 0.20 mA	
10 kHz to 30 kHz	200 mA to 2 A	3.0 mA/A + 0.20 mA	
AC Current- Measure At the listed frequencies			
10 Hz to 2 kHz	2 A to 20 A	0.82 mA/A + 2 mA	
2 kHz to 10 kHz	2 A to 20 A	2.5 mA/A + 2 mA	
Resistance - Generate	0 Ω to 10.999 9 Ω	40 $\mu\Omega/\Omega$ + 1 m Ω	Fluke 5520A
	11 Ω to 32.999 9 Ω	30 $\mu\Omega/\Omega$ + 1.5 m Ω	
	33 Ω to 109.999 9 Ω	28 $\mu\Omega/\Omega$ + 1.4 m Ω	
	110 Ω to 329.999 9 Ω	28 $\mu\Omega/\Omega$ + 2 m Ω	
	330 Ω to 1.099 999 k Ω	28 $\mu\Omega/\Omega$ + 2 m Ω	
	1.1 k Ω to 3.2999 999 k Ω	28 $\mu\Omega/\Omega$ + 20 m Ω	
	3.3 k Ω to 10.999 99 k Ω	28 $\mu\Omega/\Omega$ + 20 m Ω	

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Resistance - Generate	11 k Ω to 32.999 99 k Ω	28 $\mu\Omega/\Omega$ + 0.2 Ω	Fluke 5520A
	33 k Ω to 109.999 9 k Ω	28 $\mu\Omega/\Omega$ + 0.2 Ω	
	110 k Ω to 329.999 9 k Ω	32 $\mu\Omega/\Omega$ + 2 Ω	
	330 k Ω to 1.099 99 k Ω	32 $\mu\Omega/\Omega$ + 2 Ω	
	1.1 M Ω to 3.299 999 M Ω	60 $\mu\Omega/\Omega$ + 30 Ω	
	3.3 M Ω to 10.999 99 M Ω	0.13 m Ω/Ω + 50 Ω	
	11 M Ω to 32.999 99 M Ω	0.25 m Ω/Ω + 2.5 k Ω	
	33 M Ω to 109.999 9 M Ω	0.50 m Ω/Ω + 3 k Ω	
	110 M Ω to 329.999 9 M Ω	3 m Ω/Ω + 100 k Ω	
	330 M Ω to 1 110 M Ω	15 m Ω/Ω + 500 k Ω	
Resistance- Measure Normal Mode	2 Ω	17 $\mu\Omega/\Omega$ + 2.0 $\mu\Omega$	Fluke 8508A
	20 Ω	9.5 $\mu\Omega/\Omega$ + 0.7 $\mu\Omega$	
	2 k Ω	8 $\mu\Omega/\Omega$ + 0.25 $\mu\Omega$	
	20 k Ω	8 $\mu\Omega/\Omega$ + 0.25 $\mu\Omega$	
	200 k Ω	8 $\mu\Omega/\Omega$ + 0.25 $\mu\Omega$	
	2 Ω	9 $\mu\Omega/\Omega$ + 0.5 $\mu\Omega$	
	20 M Ω	20 $\mu\Omega/\Omega$ + 5.0 $\mu\Omega$	
	200 M Ω	120 $\mu\Omega/\Omega$ + 50 $\mu\Omega$	
	2 G Ω	1.51 m Ω/Ω + 500 $\mu\Omega$	
Capacitance-Generate 10 Hz to 10 kHz	0.19 nF to 0.399 9 nF	5 mF/F + 0.01 nF	Fluke 5520A
	0.4 nF to 1.099 9 nF	5 mF/F + 0.01 nF	
Capacitance-Generate 10 Hz to 3 kHz	0.1.1 nF to 3.299 9 nF	5 mF/F + 0.01 nF	
Capacitance-Generate 10 Hz to 1kHz	3.3 nF to 10.999 9 nF	2.5 mF/F + 0.01 nF	
	11 nF to 32.999 9 nF	2.5 mF/F + 0.1 nF	
	33 nF to 109.999 nF	2.5 mF/F + 0.1 nF	
	110 nF to 329.999 nF	2.5 mF/F + 0.3 nF	
Capacitance-Generate 10 Hz to 600 Hz	0.33 μ F to 1.099 99 μ F	2.5 mF/F + 1 nF	
Capacitance-Generate 10 Hz to 300 Hz	1.1 μ F to 3.29 999 μ F	2.5 mF/F + 3 nF	
Capacitance-Generate 10 Hz to 150 Hz	3.3 μ F to 10.999 9 μ F	2.5 mF/F + 10 nF	
Capacitance-Generate 10 Hz to 120 Hz	11 μ F to 32.999 9 μ F	4 mF/F + 30 nF	

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Capacitance-Generate 10 Hz to 80 Hz	33 μ F to 109.999 μ F	4.5 mF/F + 100 nF	Fluke 5520A
Capacitance-Generate 0 Hz to 50 Hz	110 μ F to 329.999 μ F	4.5 mF/F + 300 nF	
Capacitance-Generate 0 Hz to 20 Hz	0.33 mF to 1.099 99 mF	4.5 mF/F + 1 μ F	
Capacitance-Generate 0 Hz to 6 Hz	1.1 mF to 3.299 9 mF	4.5 mF/F + 3 μ F	
Capacitance-Generate 0 Hz to 2 Hz	3.3 mF to 10.999 9 mF	4.5 mF/F + 10 μ F	
Capacitance-Generate 0 Hz to 0.6 Hz	11 mF to 32.999 9 mF	7.5 mF/F + 30 μ F	
Capacitance-Generate 0 Hz to 0.2 Hz	33 mF to 110 mF	11 mF/F + 100 μ F	
Power- Generate 10 Hz to 20 kHz	20 dBm to 24 dBm	0.05 dB	Fluke 9640A
	14 dBm to 20 dBm	0.05 dB	
	-17 dBm to 14 dBm	0.05 dB	
	-48 dBm to -17 dBm	0.05 dB	
Power – Generate 20 kHz to 100 kHz	20 dBm to 24 dBm	0.05 dB	
	14 dBm to 20 dBm	0.05 dB	
	-17 dBm to 14 dBm	0.05 dB	
	-48 dBm to -17 dBm	0.05 dB	
Power – Generate 100 kHz to 10 MHz	20 dBm to 24 dBm	0.05 dB	
	14 dBm to 20 dBm	0.05 dB	
	-17 dBm to 14 dBm	0.05 dB	
	-48 dBm to -17 dBm	0.05 dB	
	-74 dBm to - 48 dBm	0.2 dB	
	-84 dBm to -74 dBm	0.5 dB	
	-94 dBm to -84 dBm	0.5 dB	
Power –Generate 10 MHz to 125 MHz	-130 dBm to -94 dBm	1.5 dB	
	20 dBm to 24 dBm	0.05 dB	
	14 dBm to 20 dBm	0.05 dB	
	-17 dBm to 14 dBm	0.05 dB	
	-48 dBm to -17 dBm	0.05 dB	
	-74 dBm to - 48 dBm	0.2 dB	

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Power –Generate 10 MHz to 125 MHz	-84 dBm to -74 dBm	0.5 dB	Fluke 9640A
	-94 dBm to -84 dBm	0.5 dB	
	-130 dBm to -94 dBm	1.5 dB	
Power –Generate 10 MHz to 125 MHz	20 dBm to 24 dBm	0.05 dB	
	14 dBm to 20 dBm	0.05 dB	
	-17 dBm to 14 dBm	0.05 dB	
	-48 dBm to -17 dBm	0.05 dB	
	-74 dBm to -48 dBm	0.2 dB	
	-84 dBm to -74 dBm	0.5 dB	
	-94 dBm to -84 dBm	0.5 dB	
Power –Generate 125 MHz to 300 MHz	-130 dBm to -94 dBm	1.5 dB	
	14 dBm to 20 dBm	0.1 dB	
	-17 dBm to 14 dBm	0.1 dB	
	-48 dBm to -17 dBm	0.1 dB	
	-74 dBm to -48 dBm	0.2 dB	
	-84 dBm to -74 dBm	0.5 dB	
Power –Generate 300 MHz to 1.4 GHz	-94 dBm to -84 dBm	0.5 dB	
	-130 dBm to -94 dBm	1.5 dB	
	14 dBm to 20 dBm	0.25 dB	
	-17 dBm to 14 dBm	0.25 dB	
	-48 dBm to -17 dBm	0.5 dB	
	-74 dBm to -48 dBm	0.5 dB	
	-84 dBm to -74 dBm	1.0 dB	
Power –Generate 1.4 GHz to 3 GHz	-94 dBm to -84 dBm	1.0 dB	
	-130 dBm to -94 dBm	1.0 dB	
	-17 dBm to 14 dBm	0.3 dB	
	-48 dBm to -17 dBm	0.5 dB	
	-74 dBm to -48 dBm	0.5 dB	
	-84 dBm to -74 dBm	1.0 dB	
	-94 dBm to -84 dBm	1.0 dB	
	-130 dBm to -94 dBm	1.5 dB	

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Power –Generate 3 GHz to 4 GHz	-17 dBm to 14 dBm	0.5 dB	Fluke 9640A
	-48 dBm to -17 dBm	0.5 dB	
	-74 dBm to -48 dBm	0.5 dB	
	-84 dBm to -74 dBm	1.0 dB	
Power- Measure	9 kHz to 6 GHz -60 dBm to +20 dBm	3 % of reading	Agilent U2004A
	100 kHz to 2.6 GHz -20 dBm to +30 dBm	0.5 dBm	Hewlett Packard 8901B with 11722A
	10 MHz to 18 GHz -30 dBm to +20 dBm	0.5 dBm	Hewlett Packard 437B with 8181 A
Temperature Calibration, Indication and Control Equipment used with Thermocouple Type B	600 °C to 800 °C	0.44 °C	Fluke 5520A Electrical Simulation of Thermocouple Output
	800 °C to 1 000 °C	0.34 °C	
	1 000 °C to 1 550 °C	0.30 °C	
	1 550 °C to 1 820 °C	0.33 °C	
Temperature Calibration, Indication and Control Equipment used with Thermocouple Type C	0 °C to 150 °C	0.30 °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	0.50 °C	
	1 800 °C to 2 316 °C	0.84 °C	
Temperature Calibration, Indication and Control Equipment used with Thermocouple Type E	-250 °C to -100 °C	0.50 °C	
	-100 °C to -25 °C	0.16 °C	
	-25 °C to 350 °C	0.14 °C	
	350 °C to 650 °C	0.17 °C	
	650 °C to 1 000 °C	0.24 °C	
Temperature Calibration, Indication and Control Equipment used with Thermocouple Type J	-210 °C to -100 °C	0.27 °C	
	-100 °C to -25 °C	0.16 °C	
	-30 °C to 150 °C	0.14 °C	
	150 °C to 760 °C	0.18 °C	
	760 °C to 1 200 °C	0.24 °C	

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

Electrical

MEASURED INSTRUMENT, QUANTITY OR GAUGE	RANGE (AND SPECIFICATION WHERE APPROPRIATE)	BEST MEASUREMENT CAPABILITY EXPRESSED AS AN UNCERTAINTY (\pm)	REMARKS
Temperature Calibration, Indication and Control Equipment used with Thermocouple Type K	-200 °C to -100 °C	0.33 °C	Fluke 5520A Electrical Simulation of Thermocouple Output
	-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	0.40 °C	
Temperature Calibration, Indication and Control Equipment used with Thermocouple Type N	-200 °C to -100 °C	0.40 °C	
	-100 °C to -25 °C	0.22 °C	
	-125 °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	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	0.40 °C	
Temperature Calibration, Indication and Control Equipment used with Thermocouple Type T	-250 °C to -15 °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	

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Time and Frequency

MEASURED INSTRUMENT, QUANTITY OR GAUGE	RANGE (AND SPECIFICATION WHERE APPROPRIATE)	BEST MEASUREMENT CAPABILITY EXPRESSED AS AN UNCERTAINTY (\pm)	REMARKS
Frequency- Generate	10 MHz	3.4×10^{-12} MHz	GPS Time Standard- Hewlett Packard Z3801A
	10 Hz to 4 GHz	$0.04 \mu\text{Hz/Hz} + 0.16 \text{ mHz}$	Fluke 9640A
	1 GHz to 20 GHz	3.4×10^{-12} MHz	Agilent 83731B-1E1 with Hewlett Packard Z3801A
Frequency- Measure	10 Hz to 20 GHz Resolutions to 1 Hz	$5.0 \text{ part in } 10^{12} + 1\text{Hz}$	Hewlett Packard 5350B with Hewlett Packard Z3801A

Dimensional

MEASURED INSTRUMENT, QUANTITY OR GAUGE	RANGE (AND SPECIFICATION WHERE APPROPRIATE)	BEST MEASUREMENT CAPABILITY EXPRESSED AS AN UNCERTAINTY (\pm)	REMARKS
Length	0 mm to 330 mm	$(0.35 + 0.012L) \mu\text{m}$	Pratt & Whiney LabMaster Universal
	0 mm to 610 mm	$60 \mu\text{m}$	Fowler Z_Cal 600 XT

Mass, Force, and Weighing Devices

MEASURED INSTRUMENT, QUANTITY OR GAUGE	RANGE (AND SPECIFICATION WHERE APPROPRIATE)	BEST MEASUREMENT CAPABILITY EXPRESSED AS AN UNCERTAINTY (\pm)	REMARKS
Mass	0.05 g to 61 g	0.000 7 g	Denver TL-64
	0.1 g to 4 100 g	0.05 g	Ohaus E1D120
	0.001 kg to 15 kg	0.18 g	Fairbanks 70-6115
Force-Tension	0 N to 445 N	0.22 N	Omega LC101-100 with DPM-3
	0 N to 2 000 N	1.1 N	Omega LC101-500 with DPM-3
	0 N to 9 000 N	4.2 N	Omega LC101-2K with DPM-3
	0 N to 45 000 N	22 N	Omega LC101-10K with DPM-3
	0 N to 180 000 N	265 N	Omega LC101-40K with DPM-3
Force- Compression	0 N to 1 112 N	$0.003\ 675 \text{ N/N} + 0.556 \text{ N}$	Transducer Techniques LBO-250 with Omega DPM-3
	0 N to 200 000 N	$0.001\ 025 \text{ N/N} + 26.5 \text{ N}$	Revere Transducer 792 with Omega DPM-3
	0 N to 450 000 N	$0.003\ 675 \text{ N/N} + 49 \text{ N}$	Transducer Techniques CLC-100K with Omega DPM-3

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Mechanical

MEASURED INSTRUMENT, QUANTITY OR GAUGE	RANGE (AND SPECIFICATION WHERE APPROPRIATE)	BEST MEASUREMENT CAPABILITY EXPRESSED AS AN UNCERTAINTY (\pm)	REMARKS
Torque	0 N·m to 2.3 N·m	$0.10 \times 10^{-3} \text{ N}\cdot\text{m}/\text{N}\cdot\text{m} + 1.4 \times 10^{-3} \text{ N}\cdot\text{m}$	Mountz S Series
	1.2 N·m to 12.0 N·m	$4.0 \times 10^{-3} \text{ N}\cdot\text{m}/\text{N}\cdot\text{m}$	Ingersoll-Rand ETT12
	6.0 N·m to 56 N·m	$2.5 \times 10^{-3} \text{ N}\cdot\text{m}/\text{N}\cdot\text{m}$	Mountz Torque Transducer
	34 N·m to 340 N·m	$3.5 \times 10^{-3} \text{ N}\cdot\text{m}/\text{N}\cdot\text{m}$	Armstrong 64-646
	340 N·m to 813 N·m	$8.1 \times 10^{-3} \text{ N}\cdot\text{m}/\text{N}\cdot\text{m}$	Snap On TQTP 600
	150 N·m to 1 500 N·m	$3.5 \times 10^{-3} \text{ N}\cdot\text{m}/\text{N}\cdot\text{m} + 0.18 \text{ N}\cdot\text{m}$	Transducer Techniques SWS-1k with Omega DPM-3
Pressure	5 kPa to 7 000 Pa (abs)	$0.000 02 \text{ Pa}/\text{Pa} + 10 \text{ Pa}$	DHI PG7601
	0 kPa to 52 000 kPa (rel.to atm)	52 kPa	Ashcroft AQS-2
	52 000 kPa to 280 000 kPa (rel. to atm)	$5.1 \times 10^{-3} \text{ Pa} + 62 \times 10^{-6} \text{ Pa}/\text{Pa}$	Ruska 2451 625-M100

Thermodynamic

MEASURED INSTRUMENT, QUANTITY OR GAUGE	RANGE (AND SPECIFICATION WHERE APPROPRIATE)	BEST MEASUREMENT CAPABILITY EXPRESSED AS AN UNCERTAINTY (\pm)	REMARKS
Temperature Equipment-Measure	-45 °C to 140 °C	0.02 °C	Hart Scientific 9170, Hart Scientific 5626, and Fluke 8508A
	38 °C to 320 °C	0.56 °C	King Nutronics Drywell 3604-1-101
	320 °C to 650 °C	$0.001 5 \text{ }^\circ\text{C}/^\circ\text{C} + 0.11 \text{ }^\circ\text{C}$	
Temperature Equipment-Measure (SPRT)	-196 °C to 420 °C	0.019 °C	Hart Scientific 5626 with Fluke 8508A

1. Remarks: This column shall include pertinent information about the calibration of the Measured Instrument or parameter. The information should include the type of standards used and any pertinent information about the measurement method. This column is not to be used for commercial advertisement of laboratory services.
2. The term L represents length in inches or millimeters as appropriate to the uncertainty statement.