



# PERRY JOHNSON LABORATORY ACCREDITATION, INC.

## *Certificate of Accreditation*

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

***Quality Systems Lab, Inc.  
7700 Congress Avenue, Suite #2110  
Boca Raton, FL 33487***

*(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):*

***Electrical, Thermodynamic, Mechanical, Mass, Weighing Device, Frequency, and Dimensional Laboratory and Field Calibration  
(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:*  
September 07, 2006

*Issue Date:*  
September 15, 2008

*Revision Date:*  
January 12, 2010

*Expiration Date:*  
September 14, 2010

*Accreditation No.:*  
59399

*Certificate No.:*  
L08-72-R2

*Page No.:*  
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# Certificate of Accreditation: Supplement

**Quality Systems Lab, Inc.**  
7700 Congress Avenue, Suite #2110  
Boca Raton, FL 33487

*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 – Source	0 mV to 220 mV	8 $\mu$ V/V + 0.6 $\mu$ V	Fluke 5700A/WDB
	220 mV to 2.2 V	7 $\mu$ V/V + 1 $\mu$ V	
	2.2 V to 11 V	7 $\mu$ V/V + 3.5 $\mu$ V	
	11 V to 22 V	7 $\mu$ V/V + 6.5 $\mu$ V	
	22 V to 220 V	8 $\mu$ V/V + 0.08 mV	
Fixed Points – Source	1 V	5 $\mu$ V	Fluke 732A
	1.018 V	5 $\mu$ V	
	10 V	3 $\mu$ V	
DC Voltage – Measure	10 mV to 100 mV	7 $\mu$ V/V + 0.5 $\mu$ V	HP 3458A Opt 2
	0.1 V to 1 V	6 $\mu$ V/V + 0.3 $\mu$ V	
	1 V to 10 V	6 $\mu$ V/V + 0.5 $\mu$ V	
	10 V to 100 V	10 $\mu$ V/V + 30. $\mu$ V	
DC Current – Source	0 $\mu$ A to 220 $\mu$ A	150 $\mu$ A/A + 0.02 $\mu$ A	Fluke 5700A/WDB
	0.22 mA to 2.2 mA	100 $\mu$ A/A + 0.05 $\mu$ A	
	2.2 mA to 22 mA	100 $\mu$ A/A + 0.25 $\mu$ A	
	22 mA to 220 mA	100 $\mu$ A/A + 2.5 $\mu$ A	
	0.22 A to 2.2 A	200 $\mu$ A/A + 40 $\mu$ A	
DC Current – Source	3 A to 11 A	500 $\mu$ A/A + 500 $\mu$ A	Fluke 5500A
DC Current – Measure	100 $\mu$ A to 1 mA	25 $\mu$ A/A + 5 nA	HP 3458A Opt 2
	1 mA to 10 mA	25 $\mu$ A/A + 50 nA	
	10 mA to 100 mA	40 $\mu$ A/A + 500 nA	
	100 mA to 1 A	115 mA/A + 10 $\mu$ A	
Resistance – Source Fluke 5700A/WDB	1 $\Omega$	95 $\mu\Omega$	Fluke 5700A/WDB
	1.9 $\Omega$	180 $\mu\Omega$	
	10 $\Omega$	280 $\mu\Omega$	
	19 $\Omega$	520 $\mu\Omega$	
	100 $\Omega$	1.8 M $\Omega$	
	190 $\Omega$	3.3 M $\Omega$	
	1 k $\Omega$	13 M $\Omega$	
	1.9 k $\Omega$	25 M $\Omega$	
	10 k $\Omega$	120 M $\Omega$	



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Resistance – Source Fluke 5700A/WDB	19 k $\Omega$	230 M $\Omega$	Fluke 5700A/WDB
	100 k $\Omega$	1.4 $\Omega$	
	190 k $\Omega$	2.7 $\Omega$	
	1 M $\Omega$	20 $\Omega$	
	1.9 M $\Omega$	40 $\Omega$	
	10 M $\Omega$	400 $\Omega$	
	19 M $\Omega$	900 $\Omega$	
	100 M $\Omega$	11 k $\Omega$	
Fixed Resistors IET Precision Resistors	1 $\Omega$	5.8 $\mu\Omega$	SRX-1 & SRL-1
	100 $\Omega$	580 $\mu\Omega$	SRX-100
	400 $\Omega$	2.8 M $\Omega$	SRX-400
	1 k $\Omega$	5.8 M $\Omega$	SRX-1K
	10 k $\Omega$	58 M $\Omega$	SRX-10K
Resistance – Measure Resistance Sourcing Devices	0 $\Omega$ to 10 $\Omega$	18 $\mu\Omega/\Omega$ + 50 $\mu\Omega$	HP 3458A 4 Wire Opt 2
	10 $\Omega$ to 100 $\Omega$	13 $\mu\Omega/\Omega$ + 0.5 M $\Omega$	
	0.1 k $\Omega$ to 1 k $\Omega$	11 $\mu\Omega/\Omega$ + 0.5 M $\Omega$	
	1 k $\Omega$ to 10 k $\Omega$	11 $\mu\Omega/\Omega$ + 5 M $\Omega$	
	10 k $\Omega$ to 100 k $\Omega$	11 $\mu\Omega/\Omega$ + 50 M $\Omega$	
	0.1 M $\Omega$ to 1 M $\Omega$	15 $\mu\Omega/\Omega$ + 2 $\Omega$	
	1 M $\Omega$ to 10 M $\Omega$	50 $\mu\Omega/\Omega$ + 100 $\Omega$	
	10 M $\Omega$ to 100 M $\Omega$	503 $\mu\Omega/\Omega$ + 1 k $\Omega$	
AC Voltage - Source At the listed frequencies			Fluke 5700A/WDB
10 Hz to 20 Hz	0 mV to 2.2 mV	550 $\mu\text{V}/\text{V}$ + 4.5 $\mu\text{V}$	
20 Hz to 40 Hz	0 mV to 2.2 mV	210 $\mu\text{V}/\text{V}$ + 4.5 $\mu\text{V}$	
40 Hz to 20 kHz	0 mV to 2.2 mV	105 $\mu\text{V}/\text{V}$ + 4.5 $\mu\text{V}$	
20 kHz to 50 kHz	0 mV to 2.2 mV	370 $\mu\text{V}/\text{V}$ + 4.5 $\mu\text{V}$	
50 kHz to 100 kHz	0 mV to 2.2 mV	850 $\mu\text{V}/\text{V}$ + 7 $\mu\text{V}$	
100 kHz to 300 kHz	0 mV to 2.2 mV	1.1 mV/V + 13 $\mu\text{V}$	
300 kHz to 500 kHz	0 mV to 2.2 mV	1.7 mV/V + 25 $\mu\text{V}$	
500 kHz to 1 MHz	0 mV to 2.2 mV	3.4 mV/V + 25 $\mu\text{V}$	



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AC Voltage - Source At the listed frequencies			Fluke 5700A/WDB
10 Hz to 20 Hz	2.2 mV to 22 mV	550 $\mu$ V/V + 5 $\mu$ V	
20 Hz to 40 Hz	2.2 mV to 22 mV	210 $\mu$ V/V + 5 $\mu$ V	
40 Hz to 20 kHz	2.2 mV to 22 mV	105 $\mu$ V/V + 5 $\mu$ V	
20 kHz to 50 kHz	2.2 mV to 22 mV	370 $\mu$ V/V + 5 $\mu$ V	
50 kHz to 100 kHz	2.2 mV to 22 mV	850 $\mu$ V/V + 7 $\mu$ V	
100 kHz to 300 kHz	2.2 mV to 22 mV	1.1 mV/V + 12 $\mu$ V	
300 kHz to 500 kHz	2.2 mV to 22 mV	1.7 mV/V + 25 $\mu$ V	
500 kHz to 1 MHz	2.2 mV to 22 mV	3.4 mV/V + 25 $\mu$ V	
AC Voltage - Source At the listed frequencies			
10 Hz to 20 Hz	22 mV to 220 mV	550 $\mu$ V/V + 13 $\mu$ V	
20 Hz to 40 Hz	22 mV to 220 mV	210 $\mu$ V/V + 8 $\mu$ V	
40 Hz to 20 kHz	22 mV to 220 mV	105 $\mu$ V/V + 8 $\mu$ V	
20 kHz to 50 kHz	22 mV to 220 mV	370 $\mu$ V/V + 8 $\mu$ V	
50 kHz to 100 kHz	22 mV to 220 mV	850 $\mu$ V/V + 25 $\mu$ V	
100 kHz to 300 kHz	22 mV to 220 mV	1.1 mV/V + 25 $\mu$ V	
300 kHz to 500 kHz	22 mV to 220 mV	1.7 mV/V + 30 $\mu$ V	
500 kHz to 1 MHz	22 mV to 220 mV	3.4 mV/V + 80 $\mu$ V	
AC Voltage - Measure At the listed frequencies			
1 Hz to 40 Hz	10 mV to 100 mV	70 $\mu$ V/V + 4 $\mu$ V	
40 Hz to 1 000 Hz	10 mV to 100 mV	70 $\mu$ V/V + 2 $\mu$ V	
1 kHz to 20 kHz	10 mV to 100 mV	140 $\mu$ V/V + 2 $\mu$ V	
20 kHz to 50 kHz	10 mV to 100 mV	300 $\mu$ V/V + 2 $\mu$ V	
50 kHz to 100 kHz	10 mV to 100 mV	800 $\mu$ V/V + 2 $\mu$ V	
100 kHz to 300 kHz	10 mV to 100 mV	3 mV/V + 10 $\mu$ V	
0.3 MHz to 1 MHz	10 mV to 100 mV	10 mV/V + 10 $\mu$ V	
1 MHz to 2 MHz	10 mV to 100 mV	15 mV/V + 10 $\mu$ V	



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AC Voltage - Measure At the listed frequencies			HP 3458A Opt 2
1 Hz to 40 Hz	0.1 V to 1 V	70 $\mu$ V/V + 40 $\mu$ V	
40 Hz to 1 000 Hz	0.1 V to 1 V	70 $\mu$ V/V + 20 $\mu$ V	
1 kHz to 20 kHz	0.1 V to 1 V	140 $\mu$ V/V + 20 $\mu$ V	
20 kHz to 50 kHz	0.1 V to 1 V	300 $\mu$ V/V + 20 $\mu$ V	
50 kHz to 100 kHz	0.1 V to 1 V	800 $\mu$ V/V + 20 $\mu$ V	
100 kHz to 300 kHz	0.1 V to 1 V	3 mV/V + 100 $\mu$ V	
0.3 MHz to 1 MHz	0.1 V to 1 V	10 mV/V + 100 $\mu$ V	
1 MHz to 2 MHz	0.1 V to 1 V	15 mV/V + 100 $\mu$ V	
AC Voltage - Measure At the listed frequencies			
1 Hz to 40 Hz	1 V to 10 V	70 $\mu$ V/V + 0.4 mV	
40 Hz to 1 000 Hz	1 V to 10 V	70 $\mu$ V/V + 0.2 mV	
1 kHz to 20 kHz	1 V to 10 V	140 $\mu$ V/V + 0.2 mV	
20 kHz to 50 kHz	1 V to 10 V	300 $\mu$ V/V + 0.2 mV	
50 kHz to 100 kHz	1 V to 10 V	800 $\mu$ V/V + 0.2 mV	
100 kHz to 300 kHz	1 V to 10 V	3 mV/V + 1 mV	
0.3 MHz to 1 MHz	1 V to 10 V	10 mV/V + 1 mV	
1 MHz to 2 MHz	1 V to 10 V	15 mV/V + 1 mV	
AC Current - Source At the listed frequencies			Fluke 5700A/WDB
10 Hz to 20 Hz	9 $\mu$ A to 220 $\mu$ A	700 $\mu$ A/A + 25 nA	
20 Hz to 40 Hz	9 $\mu$ A to 220 $\mu$ A	350 $\mu$ A/A + 20 nA	
40 Hz to 1 kHz	9 $\mu$ A to 220 $\mu$ A	140 $\mu$ A/A + 16 nA	
1 kHz to 5 kHz	9 $\mu$ A to 220 $\mu$ A	600 $\mu$ A/A + 40 nA	
5 kHz to 10 kHz	9 $\mu$ A to 220 $\mu$ A	1.6 mA/A + 80 nA	



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AC Current - Source At the listed frequencies			Fluke 5700A/WDB
10 Hz to 20 Hz	220 $\mu$ A to 2.2 mA	700 $\mu$ A/A + 40 nA	
20 Hz to 40 Hz	220 $\mu$ A to 2.2 mA	350 $\mu$ A/A + 35 nA	
40 Hz to 1 kHz	220 $\mu$ A to 2.2 mA	140 $\mu$ A/A + 35 nA	
1 kHz to 5 kHz	220 $\mu$ A to 2.2 mA	600 $\mu$ A/A + 400 nA	
5 kHz to 10 kHz	220 $\mu$ A to 2.2 mA	1.6 mA/A + 800 nA	
AC Current - Source At the listed frequencies			
10 Hz to 20 Hz	2.2 mA to 22 mA	700 $\mu$ A/A + 400 nA	
20 Hz to 40 Hz	2.2 mA to 22 mA	350 $\mu$ A/A + 350 nA	
40 Hz to 1 kHz	2.2 mA to 22 mA	140 $\mu$ A/A + 350 nA	
1 kHz to 5 kHz	2.2 mA to 22 mA	600 $\mu$ A/A + 4 $\mu$ A	
5 kHz to 10 kHz	2.2 mA to 22 mA	1.6 mA/A + 8 $\mu$ A	
AC Current - Source At the listed frequencies			
10 Hz to 20 Hz	22 mA to 220 mA	700 $\mu$ A/A + 4 $\mu$ A	
20 Hz to 40 Hz	22 mA to 220 mA	350 $\mu$ A/A + 3.5 $\mu$ A	
40 Hz to 1 kHz	22 mA to 220 mA	140 $\mu$ A/A + 3.5 $\mu$ A	
1 kHz to 5 kHz	22 mA to 220 mA	600 $\mu$ A/A + 40 $\mu$ A	
5 kHz to 10 kHz	22 mA to 220 mA	1.6 mA/A + 80 $\mu$ A	
AC Current - Source At the listed frequencies			
20 Hz to 1 kHz	220 mA to 2.2 A	650 $\mu$ A/A + 35 $\mu$ A	
1 kHz to 5 kHz	220 mA to 2.2 A	750 $\mu$ A/A + 80 $\mu$ A	
5 kHz to 10 kHz	220 mA to 2.2 A	8.5 mA/A + 160 $\mu$ A	
AC Current - Source At the listed frequencies			Fluke 5500A/SC600
45 Hz to 65 Hz	2.2 A to 11 A	0.6 mA/A + 2 mA	
65 Hz to 500 Hz	2.2 A to 11 A	1 mA/A + 2 mA	
500 Hz to 1 kHz	2.2 A to 11 A	3.3 mA/A + 2 mA	



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AC Current - Measure At the listed frequencies			HP 3458A Opt 2
10 Hz to 20 Hz	5 $\mu$ A to 100 $\mu$ A	4 mA/A + 30 nA	
20 Hz to 45 Hz	5 $\mu$ A to 100 $\mu$ A	1.5 mA/A + 30 nA	
45 Hz to 100 Hz	5 $\mu$ A to 100 $\mu$ A	0.6 mA/A + 30 nA	
100 Hz to 1 kHz	5 $\mu$ A to 100 $\mu$ A	0.6 mA/A + 30 nA	
AC Current - Measure At the listed frequencies			
10 Hz to 20 Hz	100 $\mu$ A to 1 mA	4 mA/A + 0.2 $\mu$ A	
20 Hz to 45 Hz	100 $\mu$ A to 1 mA	1.5 mA/A + 0.2 $\mu$ A	
45 Hz to 100 Hz	100 $\mu$ A to 1 mA	0.6 mA/A + 0.2 $\mu$ A	
100 Hz to 5 kHz	100 $\mu$ A to 1 mA	0.3 mA/A + 0.2 $\mu$ A	
5 kHz to 20 kHz	100 $\mu$ A to 1 mA	0.6 mA/A + 0.2 $\mu$ A	
20 kHz to 50 kHz	100 $\mu$ A to 1 mA	4 mA/A + 0.4 $\mu$ A	
50 kHz to 100 kHz	100 $\mu$ A to 1 mA	5.5 mA/A + 1.5 $\mu$ A	
AC Current - Measure At the listed frequencies			
10 Hz to 20 Hz	1 mA to 10 mA	4 mA/A + 2 $\mu$ A	
20 Hz to 45 Hz	1 mA to 10 mA	1.5 mA/A + 2 $\mu$ A	
45 Hz to 100 Hz	1 mA to 10 mA	0.6 mA/A + 2 $\mu$ A	
100 Hz to 5 kHz	1 mA to 10 mA	0.3 mA/A + 2 $\mu$ A	
5 kHz to 20 kHz	1 mA to 10 mA	0.6 mA/A + 2 $\mu$ A	
20 kHz to 50 kHz	1 mA to 10 mA	4 mA/A + 4 $\mu$ A	
50 kHz to 100 kHz	1 mA to 10 mA	5.5 mA/A + 15 $\mu$ A	
AC Current - Measure At the listed frequencies			
10 Hz to 20 Hz	10 mA to 100 mA	4 mA/A + 20 $\mu$ A	
20 Hz to 45 Hz	10 mA to 100 mA	1.5 mA/A + 20 $\mu$ A	
45 Hz to 100 Hz	10 mA to 100 mA	0.6 mA/A + 20 $\mu$ A	
100 Hz to 5 kHz	10 mA to 100 mA	0.3 mA/A + 20 $\mu$ A	
5 kHz to 20 kHz	10 mA to 100 mA	0.6 mA/A + 20 $\mu$ A	
20 kHz to 50 kHz	10 mA to 100 mA	4 mA/A + 40 $\mu$ A	
50 kHz to 100 kHz	10 mA to 100 mA	5.5 mA/A + 150 $\mu$ A	



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AC Current - Measure At the listed frequencies			HP 3458A Opt 2
10 Hz to 20 Hz	100 mA to 1 A	4 mA/A + 200 $\mu$ A	
20 Hz to 45 Hz	100 mA to 1 A	1.6 mA/A + 200 $\mu$ A	
45 Hz to 100 Hz	100 mA to 1 A	0.8 mA/A + 200 $\mu$ A	
100 Hz to 5 kHz	100 mA to 1 A	1 mA/A + 200 $\mu$ A	
5 kHz to 20 kHz	100 mA to 1 A	3 mA/A + 200 $\mu$ A	
20 kHz to 50 kHz	100 mA to 1 A	10 mA/A + 400 $\mu$ A	
Oscilloscopes - Squarewave Signal At the listed frequencies			Fluke 5500A/SC600
50 $\Omega$ @ 1 kHz	1 mV to 6.6 V p-p	2.5 mV/V + 40 $\mu$ V	
1 M $\Omega$ @ 1 kHz	1 mV to 130 V p-p	2.5 mV/V + 40 $\mu$ V	
Leveled Sine Wave – Amplitude At the listed frequencies			
50 kHz reference	5 mV to 5.5 V	20 mV/V + 300 $\mu$ V	
50 kHz to 100 MHz	5 mV to 5.5 V	35 mV/V + 300 $\mu$ V	
100 MHz to 300 MHz	5 mV to 5.5 V	40 mV/V + 300 $\mu$ V	
300 MHz to 600 MHz	5 mV to 5.5 V	60 mV/V + 300 $\mu$ V	
Leveled Sine Wave – Flatness At the listed frequencies			
50 kHz to 100 MHz	5 mV to 5.5 V	15 mV/V + 100 $\mu$ V	
100 MHz to 300 MHz	5 mV to 5.5 V	20 mV/V + 100 $\mu$ V	
300 MHz to 600 MHz	5 mV to 5.5 V	40 mV/V + 100 $\mu$ V	
Rise Time	$\leq$ 300 ps	100 ps	
Temperature Calibration, Indication, and Control Equipment used with Thermocouple Type E	-250 $^{\circ}$ C to -100 $^{\circ}$ C	0.50 $^{\circ}$ C	
	-100 $^{\circ}$ C to -25 $^{\circ}$ C	0.16 $^{\circ}$ C	
	-25 $^{\circ}$ C to 350 $^{\circ}$ C	0.14 $^{\circ}$ C	
	350 $^{\circ}$ C to 650 $^{\circ}$ C	0.16 $^{\circ}$ C	
	650 $^{\circ}$ C to 1 000 $^{\circ}$ C	0.21 $^{\circ}$ C	



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Temperature Calibration, Indication, and Control Equipment used with Thermocouple Type J	-210 °C to -100 °C	0.27 °C	Electrical Simulation of Thermocouple Output Fluke 5500A/SC600
	-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	-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	0.40 °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 S	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	-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	
Temperature Calibration, Indication, and Control Equipment used with RTD Pt 385, 100 Ω	-200 °C to -80 °C	0.05 °C	Electrical Simulation of RTD Output Fluke 5500A/SC600
	-80 °C to 0 °C	0.05 °C	
	0 °C to 100 °C	0.07 °C	
	100 °C to 300 °C	0.09 °C	
	300 °C to 400 °C	0.10 °C	
	400 °C to 630 °C	0.12 °C	
	630 °C to 800 °C	0.23 °C	



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Temperature Calibration, Indication, and Control Equipment used with RTD Pt 3926, 100 Ω	-200 °C to -80 °C	0.05 °C	Electrical Simulation of RTD Output Fluke 5500A/SC600
	-80 °C to 0 °C	0.05 °C	
	0 °C to 100 °C	0.07 °C	
	100 °C to 300 °C	0.09 °C	
	300 °C to 400 °C	0.10 °C	
	400 °C to 630 °C	0.12 °C	
Temperature Calibration, Indication, and Control Equipment used with RTD Pt 3916, 100 Ω	-200 °C to -190 °C	0.25 °C	
	-190 °C to -80 °C	0.04 °C	
	-80 °C to 0 °C	0.05 °C	
	0 °C to 100 °C	0.06 °C	
	100 °C to 260 °C	0.07 °C	
	260 °C to 300 °C	0.08 °C	
	300 °C to 400 °C	0.09 °C	
	400 °C to 600 °C	0.10 °C	
Temperature Calibration, Indication, and Control Equipment used with RTD Pt 385, 200 Ω	-200 °C to -80 °C	0.04 °C	
	-80 °C to 0 °C	0.04 °C	
	0 °C to 100 °C	0.04 °C	
	100 °C to 260 °C	0.05 °C	
	260 °C to 300 °C	0.12 °C	
	300 °C to 400 °C	0.13 °C	
	400 °C to 600 °C	0.14 °C	
	600 °C to 630 °C	0.16 °C	
Temperature Calibration, Indication, and Control Equipment used with RTD Pt 385, 500 Ω	-200 °C to -80 °C	0.04 °C	
	-80 °C to 0 °C	0.05 °C	
	0 °C to 100 °C	0.05 °C	
	100 °C to 260 °C	0.06 °C	
	260 °C to 300 °C	0.08 °C	
	300 °C to 400 °C	0.08 °C	
	400 °C to 600 °C	0.09 °C	
	600 °C to 630 °C	0.11 °C	



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Temperature Calibration, Indication, and Control Equipment used with RTD Pt 385, 1 000 $\Omega$	-200 °C to -80 °C	0.03 °C	Electrical Simulation of RTD Output Fluke 5500A/SC600
	-80 °C to 0 °C	0.03 °C	
	0 °C to 100 °C	0.04 °C	
	100 °C to 260 °C	0.05 °C	
	260 °C to 300 °C	0.06 °C	
	300 °C to 400 °C	0.07 °C	
	400 °C to 600 °C	0.07 °C	
	600 °C to 630 °C	0.23 °C	
Temperature Calibration, Indication, and Control Equipment used with RTD PtNi 385, 120 $\Omega$ (Ni 120)	-80 °C to 0 °C	0.08 °C	
	0 °C to 100 °C	0.08 °C	
	100 °C to 260 °C	0.14 °C	
Temperature Calibration, Indication, and Control Equipment used with RTD Cu 427, 10 $\Omega$	-100 °C to 260 °C	0.30 °C	

## Thermodynamic

MEASURED INSTRUMENT, QUANTITY OR GAUGE	RANGE (AND SPECIFICATION WHERE APPROPRIATE)	BEST MEASUREMENT CAPABILITY EXPRESSED AS AN UNCERTAINTY ( $\pm$ )	REMARKS
Temperature - Source	-40 °C to 300 °C	0.02 °C	Hart Scientific 7340 & 6330 w/ Hart 1529 & SPRT
	300 °C to 1 100 °C	1.2 °C	Hart Scientific Furnace w/ Hart 1529 & SPRT
Triple Point of Mercury	-38.83 °C	0.000 25 °C	ITS-90 Fixed Points Hart 9210 & 9260 w/ Hart Fixed Point Cells
Triple Point of Water	0.01 °C	0.000 2 °C	ITS-90 Fixed Points Hart 9210 & 9260 w/ Hart Fixed Point Cells
Indium Freezing Point	156.598 5 °C	0.002 °C	ITS-90 Fixed Points Hart 9210 & 9260 w/ Hart Fixed Point Cells



# Certificate of Accreditation: Supplement

**Quality Systems Lab, Inc.**  
 7700 Congress Avenue, Suite #2110  
 Boca Raton, FL 33487

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

## Thermodynamic

MEASURED INSTRUMENT, QUANTITY OR GAUGE	RANGE (AND SPECIFICATION WHERE APPROPRIATE)	BEST MEASUREMENT CAPABILITY EXPRESSED AS AN UNCERTAINTY ( $\pm$ )	REMARKS
Tin Freezing Point	231.928 °C	0.003 °C	ITS-90 Fixed Points Hart 9210 & 9260 w/ Hart Fixed Point Cells
Zinc Freezing Point	419.527 °C	0.004 °C	ITS-90 Fixed Points Hart 9210 & 9260 w/ Hart Fixed Point Cells
Mikron 320 IR Source	30 °C to 550 °C	1.5 °C	Hart 1529 & SPRT
Temperature - Measure	-189 °C to 0.01 °C	8 mK	
	0.01 °C to 419 °C	10 mK	
Relative Humidity - Generate	419 °C to 1 200 °C	1.2 °C	
	10 % RH to 80 % RH	2 % RH	Rense S-503
	11 % RH	1.0 % RH	Standard Salts
33 % RH	1.0 % RH		
Relative Humidity - Measure	75 % RH	1.0 % RH	
	5 % RH to 95 % RH	1.0 % RH	Vaisala HMI 41

## Mechanical

MEASURED INSTRUMENT, QUANTITY OR GAUGE	RANGE (AND SPECIFICATION WHERE APPROPRIATE)	BEST MEASUREMENT CAPABILITY EXPRESSED AS AN UNCERTAINTY ( $\pm$ )	REMARKS
Torque – Measure	0.564 9 N·m to 5.649 2 N·m (5 lbf·in to 50 lbf·in)	0.025 N·m/N·m (0.22 lbf·in)	CDI 5000ST with Loader
Pressure – Source	-103.5 kPa to 103.5 kPa (-15 PSIG to 15 PSIG)	0.025 % of full scale	Transmation 190
	0 kPa to 689.5 kPa (0 PSIG to 100 PSIG)	0.025 % of full scale	
Pressure – Source	389.5 kPa to 20 684.3 kPa (100 PSIG to 3 000 PSIG)	0.05 % of full scale	Druck DPI 320
Pressure – Source	389.5 kPa to 68 947.6 kPa (100 PSIG to 10 000 PSIG)	0.1 % of full scale	Druck DPI 305



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## Mass, Force, and Weighing Devices

MEASURED INSTRUMENT, QUANTITY OR GAUGE	RANGE (AND SPECIFICATION WHERE APPROPRIATE)	BEST MEASUREMENT CAPABILITY EXPRESSED AS AN UNCERTAINTY ( $\pm$ )	REMARKS
Scales and Balances	0 kg to 4.535 9 kg (0 lb to 10 lb)	0.009 9 % of reading	Comparison to Class F Standard Weights NIST Handbook 44
	0 kg to 294.835 kg (0 lb to 650 lb)	0.01 % of reading	
	100 g to 1 000 g	0.01 g	Comparison to Ultra Class Standard Weights
	1 kg to 5 kg	0.1 g	

## Time and Frequency

MEASURED INSTRUMENT, QUANTITY OR GAUGE	RANGE (AND SPECIFICATION WHERE APPROPRIATE)	BEST MEASUREMENT CAPABILITY EXPRESSED AS AN UNCERTAINTY ( $\pm$ )	REMARKS
Frequency – Source	100 kHz to 2.4 GHz	0.55 $\mu$ Hz/Hz $\pm$ 3 $\mu$ Hz	Marconi 2024
	2 GHz to 18 GHz	30 $\mu$ Hz/Hz $\pm$ 10 $\mu$ Hz	Gigatronics 605 RF Source
Frequency – Measure	10 Hz to 225 MHz	2.5 $\mu$ Hz/Hz $\pm$ 10 $\mu$ Hz	HP 53132A Opt 2
	1 MHz to 3 GHz	5 $\mu$ Hz/Hz $\pm$ 20 $\mu$ Hz	EIP 545

## Dimensional

MEASURED INSTRUMENT, QUANTITY OR GAUGE	RANGE (AND SPECIFICATION WHERE APPROPRIATE)	BEST MEASUREMENT CAPABILITY EXPRESSED AS AN UNCERTAINTY ( $\pm$ )	REMARKS
Height Gages	0 cm to 45.72 cm (0 in to 18 in)	1.3 $\mu$ m (51 $\mu$ in)	Ceramic Blocks
Surface Plates - Flatness	30.48 cm to 121.92 cm (12 in to 48 in)	1.3 $\mu$ m (51 $\mu$ in)	Interferometer

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.