



# PERRY JOHNSON LABORATORY ACCREDITATION, INC.

## Certificate of Accreditation

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

***Pharmaceutical Calibrations and Instrumentation, LLC***  
***8100 Brownleigh Dr., #100A, Raleigh, NC 27617***

*(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, Mechanical, and Thermodynamic Calibration***  
***(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/Operations Manager

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

<i>Initial Accreditation Date:</i>	<i>Issue Date:</i>	<i>Accreditation No.:</i>	<i>Certificate No.:</i>
August 12, 2011	August 12, 2011	54363	L11-128

*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.pjlabs.com](http://www.pjlabs.com)*



# Certificate of Accreditation: Supplement

## Pharmaceutical Calibrations and Instrumentation, LLC

8100 Brownleigh Dr., #100A, Raleigh, NC 27617  
 Steve Hilker Phone: 919-781-7787

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

### Mechanical

MEASURED INSTRUMENT, QUANTITY OR GAUGE	RANGE (AND SPECIFICATION WHERE APPROPRIATE)	CALIBRATION AND MEASUREMENT CAPABILITY EXPRESSED AS AN UNCERTAINTY ( $\pm$ )	CALIBRATION EQUIPMENT AND REFERENCE STANDARDS USED
Equipment to Measure Pressure	-14.5 psi to 0 psi	0.01 psi	Ruska 7215i
	- 3 in H <sub>2</sub> O to 3 in H <sub>2</sub> O	0.000 15 in H <sub>2</sub> O	Ruska 7250LP
	-30 in H <sub>2</sub> O to 30 in H <sub>2</sub> O	0.005 in H <sub>2</sub> O	Ruska 7250LP
	30 in H <sub>2</sub> O to 800 in H <sub>2</sub> O	0.05% of reading	GE Sensing 36 13-6-P
	30 to 50 psi	0.0137 psi	Ruska 7215i
	50 to 500 psi	0.05 % reading	
	500 to 15000 psi	1.0 % of reading	T-150 Deadweight tester
Torque Wrenches	0.5 lbf-ft to 5 lbf-ft-lb	1.0 % of reading	Mountz Transducer and Indicator
	5 lbf-ft to 50 lbf-ft	1.0% of reading	Mountz Transducer and Indicator
	50 lbf-ft to 500 lbf-ft	1.0% of reading	Mountz Transducer and Indicator

### Thermodynamic

MEASURED INSTRUMENT, QUANTITY OR GAUGE	RANGE (AND SPECIFICATION WHERE APPROPRIATE)	CALIBRATION AND MEASUREMENT CAPABILITY EXPRESSED AS AN UNCERTAINTY ( $\pm$ )	CALIBRATION EQUIPMENT AND REFERENCE STANDARDS USED
Equipment to Measure Temperature PRT	-196 °C to 660 °C	0.025 °C	Hart 1575 and Hart 5699 SPRT
	0.01 °C	0.005 °C	Triple Point of Water
Equipment to Measure Temperature Thermistor	-40 °C to 140 °C	0.025 °C	Hart 1575 and Hart 5699 SPRT
	0.01 °C	0.005 °C	Triple Point of Water
Equipment to Measure Temperature LIG thermometer	-80 °C to 500 °C	0.025 °C	Hart 2560 and Hart 5628 SPRT
Equipment to Measure Temperature Thermocouple – Type T	-196°C to 400 °C	0.25 °C	Hart 2560 and Hart 5628 SPRT
Equipment to Measure Temperature Thermocouple Types J & K	0°C to 600 °C	0.35 °C	Hart 2560 and Hart 5628 SPRT
Equipment to Measure Humidity	10 % RH to 95 % RH	0.75 % RH	Thunder Scientific 2500 Humidity Generator



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### Electrical

MEASURED INSTRUMENT, QUANTITY OR GAUGE	RANGE (AND SPECIFICATION WHERE APPROPRIATE)	CALIBRATION AND MEASUREMENT CAPABILITY EXPRESSED AS AN UNCERTAINTY ( $\pm$ )	CALIBRATION EQUIPMENT AND REFERENCE STANDARDS USED
Equipment to Measure DC Voltage	0.009 mV to 329.999 9 mV	60 $\mu$ V/V of reading + 3 $\mu$ V	Fluke 5500A-SC300 Calibrator
	330 mV to 3.299 999 V	50 $\mu$ V/V of reading + 5 $\mu$ V	
	3.3 V to 32.999 99 V	50 $\mu$ V/V of reading + 50 $\mu$ V	
	33 V to 329.999 9 V	55 $\mu$ V/V of reading + 500 $\mu$ V	
	330 V to 1 000.000 V	55 $\mu$ V/V of reading + 1500 $\mu$ V	
Equipment to Output DC Voltage	0.000 3 $\mu$ V to 200 mV	5.0 $\mu$ V/V of reading + 0.1 $\mu$ V	Fluke 8508A Reference Multimeter
	200 mV to 2 V	3.5 $\mu$ V/V of reading + 0.4 $\mu$ V	
	2 V to 20 V	3.5 $\mu$ V/V of reading + 4.0 $\mu$ V	
	20 V to 200 V	5.5 $\mu$ V/V of reading + 0.04 mV	
	200 V to 1 000 V	5.5 $\mu$ V/V of reading + 0.5 mV	
	1 000 to 6 000 VDC	10 mV/V of reading + 2 V	Fluke 80K-6 HV Probe with 8060A Multimeter
Equipment to Measure DC Current	0.00 015 mA to 3.299 99 mA	0.5 mA/A of reading + 0.05 $\mu$ A	Fluke 5500A-SC300 Calibrator
	3.3 mA to 32.999 9 mA	0.1 mA/A of reading + 0.25 $\mu$ A	
	33 mA to 329.999 mA	0.1 mA/A of reading + 3.3 $\mu$ A	
	330 mA to 2.199 99 A	0.3 mA/A of reading + 44 $\mu$ A	
	2.2 A to 11 A	0.6 mA/A of reading + 330 $\mu$ A	
Equipment to Output DC Current	0.00 12 $\mu$ A to 200 $\mu$ A	12 $\mu$ A/A of reading + 0.4 nA	Fluke 8508A Reference Multimeter
	200 $\mu$ A to 2 mA	12 $\mu$ A/A of reading + 4 nA	
	2 mA to 20 mA	14 $\mu$ A/A of reading + 0.04 $\mu$ A	
	20 mA to 200 mA	48 $\mu$ A/A of reading + 0.8 $\mu$ A	
	200 mA to 2 A	185 $\mu$ A/A of reading + 16 $\mu$ A	
	2 A to 20 A	400 $\mu$ A/A of reading + 400 $\mu$ A	



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Equipment to Measure Resistance	0.024 $\Omega$ to 10.99 $\Omega$	0.12 m $\Omega$ / $\Omega$ of reading + 0.008 $\Omega$	Fluke 5500A-SC300 Calibrator
	11 $\Omega$ to 32.999 $\Omega$	0.12 m $\Omega$ / $\Omega$ of reading + 0.015 $\Omega$	
	33 $\Omega$ to 109.999 $\Omega$	90 $\mu\Omega$ / $\Omega$ of reading + 0.015 $\Omega$	
	110 $\Omega$ to 329.999 $\Omega$	90 $\mu\Omega$ / $\Omega$ of reading + 0.015 $\Omega$	
	330 $\Omega$ to 1.011 11 k $\Omega$	90 $\mu\Omega$ / $\Omega$ of reading + 0.06 $\Omega$	
	1.1 k $\Omega$ to 3.299 99 k $\Omega$	90 $\mu\Omega$ / $\Omega$ of reading + 0.06 $\Omega$	
	3.3 k $\Omega$ to 10.999 9 k $\Omega$	90 $\mu\Omega$ / $\Omega$ of reading + 0.6 $\Omega$	
	11 k $\Omega$ to 32.999 9 k $\Omega$	90 $\mu\Omega$ / $\Omega$ of reading + 0.6 $\Omega$	
	33 k $\Omega$ to 109.999 k $\Omega$	90 m $\Omega$ / $\Omega$ of reading + 6 $\Omega$	
	110 K $\Omega$ to 329.999 k $\Omega$	0.12 m $\Omega$ / $\Omega$ of reading + 6 $\Omega$	
	330 k $\Omega$ to 1.099 99 M $\Omega$	0.15 m $\Omega$ / $\Omega$ of reading + 55 $\Omega$	
	1.1 M $\Omega$ to 3.299 99 M $\Omega$	0.15 m $\Omega$ / $\Omega$ of reading + 55 $\Omega$	
	3.3 M $\Omega$ to 10.999 9 M $\Omega$	0.6 m $\Omega$ / $\Omega$ of reading + 550 $\Omega$	
	11 M $\Omega$ to 32.999 9 M $\Omega$	1 m $\Omega$ / $\Omega$ of reading + 550 $\Omega$	
	33 M $\Omega$ to 109.999 M $\Omega$	5 m $\Omega$ / $\Omega$ of reading + 5.5 k $\Omega$	
110 M $\Omega$ to 330 M $\Omega$	5 m $\Omega$ / $\Omega$ of reading + 16.5 k $\Omega$		
Equipment to Output Resistance	0.000 012 $\Omega$ to 2 $\Omega$	17 $\mu\Omega$ / $\Omega$ of reading + 4 $\mu\Omega$	Fluke 8508A Reference Multimeter
	2 $\Omega$ to 20 $\Omega$	9.5 $\mu\Omega$ / $\Omega$ of reading + 28 $\mu\Omega$	
	20 $\Omega$ to 200 $\Omega$	8.0 $\mu\Omega$ / $\Omega$ of reading + 50 $\mu\Omega$	
	200 $\Omega$ to 2 k $\Omega$	8.0 $\mu\Omega$ / $\Omega$ of reading + 500 $\mu\Omega$	
	2 k $\Omega$ to 20 k $\Omega$	8.0 $\mu\Omega$ / $\Omega$ of reading + 5.0 m $\Omega$	
	20 k $\Omega$ to 200 k $\Omega$	8.0 $\mu\Omega$ / $\Omega$ of reading + 50 m $\Omega$	
	200 k $\Omega$ to 2 M $\Omega$	9.0 $\mu\Omega$ / $\Omega$ of reading +1 $\Omega$	
	2 M $\Omega$ to 20 M $\Omega$	20 $\mu\Omega$ / $\Omega$ of reading +100 $\Omega$	
	20 M $\Omega$ to 200 M $\Omega$	120 $\mu\Omega$ / $\Omega$ of reading + 10 k $\Omega$	
	200 M $\Omega$ to 2 G $\Omega$	1510 $\mu\Omega$ / $\Omega$ of reading + 100 k $\Omega$	
2 G $\Omega$ to 20 G $\Omega$	1510 $\mu\Omega$ / $\Omega$ of reading + 1 M $\Omega$		



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Equipment to Measure Capacitance	0.33 nF to 0.499 9 nF	5 mF/F of reading + 0.01 nF	Fluke 5500A-SC300 Calibrator
	0.5 nF to 1.099 9 nF	5 mF/F of reading + 0.01 nF	
	1.1 nF to 3.299 9 nF	5 mF/F of reading + 0.01 nF	
	3.3 nF to 10.999 nF	5 mF/F of reading + 0.01 nF	
	11 nF to 32.999 nF	2.5 mF/F of reading + 0.1 nF	
	33 nF to 109.99 nF	2.5 mF/F of reading + 0.1 nF	
	110 nF to 329.99 nF	2.5 mF/F of reading + 0.3 nF	
	0.33 $\mu$ F to 1.099 9 $\mu$ F	2.5 mF/F of reading + 1 nF	
	1.1 $\mu$ F to 3.299 9 $\mu$ F	3.5 mF/F of reading + 3 nF	
	3.3 $\mu$ F to 10.999 $\mu$ F	3.5 mF/F of reading + 10 nF	
	11 $\mu$ F to 32.999 $\mu$ F	4 mF/F of reading + 30 nF	
	33 $\mu$ F to 109.99 $\mu$ F	5 mF/F of reading + 100 nF	
110 $\mu$ F to 329.99 $\mu$ F	7 mF/F of reading + 300 nF		
Equipment to Measure AC Voltage at the listed frequencies			Fluke 5500A-SC300 Calibrator
10 Hz to 45 Hz	1 mV to 32.999 mV	3.5 mV/V of reading + 20 $\mu$ V	
45 Hz to 10 kHz	1 mV to 32.999 mV	1.5 mV/V of reading + 20 $\mu$ V	
10 kHz to 20 kHz	1 mV to 32.999 mV	20 mV/V of reading + 20 $\mu$ V	
20 kHz to 50 kHz	1 mV to 32.999 mV	2.5 mV/V of reading + 20 $\mu$ V	
50 kHz to 100 kHz	1 mV to 32.999 mV	3.5 mV/V of reading + 20 $\mu$ V	
100 kHz to 500 kHz	1 mV to 32.999 mV	100 mV/V of reading + 20 $\mu$ V	
Equipment to Measure AC Voltage at the listed frequencies			Fluke 5500A-SC300 Calibrator
10 Hz to 45 Hz	33 mV to 329.999 mV	2.5 mV/V of reading + 50 $\mu$ V	
45 Hz to 10 kHz	33 mV to 329.999 mV	0.5 mV/V of reading + 20 $\mu$ V	
10 kHz to 20 kHz	33 mV to 329.999 mV	1.0 mV/V of reading + 20 $\mu$ V	
20 kHz to 50 kHz	33 mV to 329.999 mV	1.6 mV/V of reading + 40 $\mu$ V	
50 kHz to 100 kHz	33 mV to 329.999 mV	2.4 mV/V of reading + 170 $\mu$ V	
100 kHz to 500 kHz	33 mV to 329.999 mV	7.0 mV/V of reading + 330 $\mu$ V	



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Equipment to Measure AC Voltage at the listed frequencies			Fluke 5500A-SC300 Calibrator
10 Hz to 45 Hz	0.33 V to 3.299 99 V	1.5 mV/V of reading + 250 $\mu$ V	
45 Hz to 10 kHz	0.33 V to 3.299 99 V	0.3 mV/V of reading + 60 $\mu$ V	
10 kHz to 20 kHz	0.33 V to 3.299 99 V	0.8 mV/V of reading + 60 $\mu$ V	
20 kHz to 50 kHz	0.33 V to 3.299 99 V	1.4 mV/V of reading + 300 $\mu$ V	
50 kHz to 100 kHz	0.33 V to 3.299 99 V	2.4 mV/V of reading + 1.7 mV	
100 kHz to 500 kHz	0.33 V to 3.299 99 V	5.0 mV/V of reading + 3.3 mV	
Equipment to Measure AC Voltage at the listed frequencies			
10 Hz to 45 Hz	3.3 V to 32.999 9 V	1.5 mV/V of reading + 2.5 mV	
45 Hz to 10 kHz	3.3 V to 32.999 9 V	0.4 mV/V of reading + 600 $\mu$ V	
10 kHz to 20 kHz	3.3 V to 32.999 9 V	0.8 mV/V of reading + 2.6 mV	
20 kHz to 50 kHz	3.3 V to 32.999 9 V	1.9 mV/V of reading + 5 mV	
50 kHz to 100 kHz	3.3 V to 32.999 9 V	2.4 mV/V of reading + 17 mV	
Equipment to Measure AC Voltage at the listed frequencies			
45 Hz to 1 kHz	33 V to 329.999 V	0.5 mV/V of reading + 6.6 mV	
1 kHz to 10 kHz	33 V to 329.999 V	0.8 mV/V of reading + 15 $\mu$ V	
10 kHz to 20 kHz	33 V to 329.999 V	0.9 mV/V of reading + 33 $\mu$ V	
Equipment to Measure AC Voltage at the listed frequencies			
45 Hz to 1 kHz	330 V 1020 V	0.5 mV/V of reading + 80 mV	
1 kHz to 5 kHz	330 V to 1020 V	2.0 mV/V of reading + 100 $\mu$ V	
5 kHz 10 kHz	330 V 1020 V	2.0 mV/V of reading + 500 $\mu$ V	
Equipment to Output AC Voltage at the listed frequencies			Fluke 8508A Reference Multimeter
1 Hz - 10 Hz	0.052 mV to 200 mV	165 $\mu$ V/V of reading + 14 $\mu$ V	
10 Hz - 40 Hz	0.052 mV to 200 mV	140 $\mu$ V/V of reading + 4 $\mu$ V	
40 Hz - 100 Hz	0.052 mV to 200 mV	115 $\mu$ V/V of reading + 4 $\mu$ V	
100 Hz - 2 kHz	0.052 mV to 200 mV	110 $\mu$ V/V of reading + 2 $\mu$ V	
2 kHz - 10 kHz	0.052 mV to 200 mV	135 $\mu$ V/V of reading + 4 $\mu$ V	
10 kHz - 30 kHz	0.052 mV to 200 mV	340 $\mu$ V/V of reading + 8 $\mu$ V	
30 kHz - 100 kHz	0.052 mV to 200 mV	765 $\mu$ V/V of reading + 20 $\mu$ V	



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Equipment to Output AC Voltage at the listed frequencies			Fluke 8508A Reference Multimeter
1 Hz - 10 Hz	200 mV to 2 V	150 $\mu$ V/V of reading + 120 $\mu$ V	
10 Hz - 40 Hz	200 mV to 2 V	115 $\mu$ V/V of reading + 20 $\mu$ V	
40 Hz - 100 Hz	200 mV to 2 V	90 $\mu$ V/V of reading + 20 $\mu$ V	
100 Hz - 2 kHz	200 mV to 2 V	75 $\mu$ V/V of reading + 20 $\mu$ V	
2 kHz - 10 kHz	200 mV to 2 V	110 $\mu$ V/V of reading + 20 $\mu$ V	
10 kHz - 30 kHz	200 mV to 2 V	220 $\mu$ V/V of reading + 40 $\mu$ V	
30 kHz - 100 kHz	200 mV to 2 V	570 $\mu$ V/V of reading + 200 $\mu$ V	
100 kHz - 300 kHz	200 mV to 2 V	3 mV/V of reading + 2 mV	
300 kHz - 1 MHz	200 mV to 2 V	10 mV/V of reading + 20 mV	
Equipment to Source AC Voltage at the listed frequencies			
1 Hz - 10 Hz	2 V to 20 V	150 $\mu$ V/V of reading + 1.2 mV	
10 Hz - 40 Hz	2 V to 20 V	115 $\mu$ V/V of reading + 200 $\mu$ V	
40 Hz - 100 Hz	2 V to 20 V	90 $\mu$ V/V of reading + 200 $\mu$ V	
100 Hz - 2 kHz	2 V to 20 V	75 $\mu$ V/V of reading + 200 $\mu$ V	
2 kHz - 10 kHz	2 V to 20 V	110 $\mu$ V/V of reading + 200 $\mu$ V	
10 kHz - 30 kHz	2 V to 20 V	220 $\mu$ V/V of reading + 400 $\mu$ V	
30 kHz - 100 kHz	2 V to 20 V	570 $\mu$ V/V of reading + 2 mV	
100 kHz - 300 kHz	2 V to 20 V	3 mV/V of reading + 20 mV	
300 kHz - 1 MHz	2 V to 20 V	10 mV/V of reading + 200 mV	
Equipment to Source AC Voltage at the listed frequencies			
1 Hz - 10 Hz	20 V to 200 V	150 $\mu$ V/V of reading + 12 mV	
10 Hz - 40 Hz	20 V to 200 V	115 $\mu$ V/V of reading + 2 mV	
40 Hz - 100 Hz	20 V to 200 V	90 $\mu$ V/V of reading + 2 mV	
100 Hz - 2 kHz	20 V to 200 V	75 $\mu$ V/V of reading + 2 mV	
2 kHz - 10 kHz	20 V to 200 V	110 $\mu$ V/V of reading + 2 mV	
10 kHz - 30 kHz	20 V to 200 V	220 $\mu$ V/V of reading + 4 mV	
30 kHz - 100 kHz	20 V to 200 V	570 $\mu$ V/V of reading + 20 mV	
100 kHz - 300 kHz	20 V to 200 V	3 mV/V of reading + 200 mV	
300 kHz - 1 MHz	20 V to 200 V	10 mV/V of reading + 2 V	
Equipment to Source AC Voltage at the listed frequencies			
1 Hz - 10 Hz	200 to 1050 V	150 $\mu$ V/V of reading + 73.5 mV	
10 Hz - 40 Hz	200 to 1050 V	120 $\mu$ V/V of reading + 21 mV	
40 Hz - 10 kHz	200 to 1050 V	115 $\mu$ V/V of reading + 21 mV	
10 kHz - 30 kHz	200 to 1050 V	225 $\mu$ V/V of reading + 42 mV	
30 kHz - 100 kHz	200 to 1050 V	580 $\mu$ V/V of reading + 210 mV	
45 Hz to 1 kHz	1000 to 6000 V	11.2 mV/V of reading + 12 V	Fluke 80K-6 HV Probe with 806 0A Multimeter



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Equipment to Measure AC Current at the listed frequencies			Fluke 5500A-SC300 Calibrator
10 Hz to 20 Hz	0.33 mA to 3.299 9 mA	2 mA/A of reading + 0.3 $\mu$ A	
20 Hz to 45 Hz	0.33 mA to 3.299 9 mA	1mA/A of reading + 0.3 $\mu$ A	
45 Hz to 1 kHz	0.33 mA to 3.299 9 mA	1mA/A of reading + 0.3 $\mu$ A	
1 kHz to 5 kHz	0.33 mA to 3.299 9 mA	2 mA/A of reading + 0.3 $\mu$ A	
5 kHz to 10 kHz	0.33 mA to 3.299 9 mA	6 mA/A of reading + 0.3 $\mu$ A	
Equipment to Measure AC Current at the listed frequencies			
10 Hz to 20 Hz	3.3 mA to 32.999 mA	2 mA/A of reading + 3 $\mu$ A	
20 Hz to 45 Hz	3.3 mA to 32.999 mA	1 mA/A of reading + 3 $\mu$ A	
45 Hz to 1 kHz	3.3 mA to 32.999 mA	0.9 mA/A of reading + 3 $\mu$ A	
1 kHz to 5 kHz	3.3 mA to 32.999 mA	2 mA/A of reading + 3 $\mu$ A	
5 kHz to 10 kHz	3.3 mA to 32.999 mA	6 mA/A of reading + 3 $\mu$ A	
Equipment to Measure AC Current at the listed frequencies			
10 Hz to 20 Hz	33 mA to 329.99 mA	2 mA/A of reading + 30 $\mu$ A	
20 Hz to 45 Hz	33 mA to 329.99 mA	1 mA/A of reading + 30 $\mu$ A	
45 Hz to 1 kHz	33 mA to 329.99 mA	0.9 mA/A of reading + 30 $\mu$ A	
1 kHz to 5 kHz	33 mA to 329.99 mA	2 mA/A of reading + 30 $\mu$ A	
5 kHz to 10 kHz	33 mA to 329.99 mA	6 mA/A of reading + 30 $\mu$ A	
Equipment to Measure AC Current at the listed frequencies			
10 Hz to 45 Hz	0.33 A to 2.199 99 A	2 mA/A of reading + 300 $\mu$ A	
45 Hz to 1 kHz	0.33 A to 2.199 99 A	1 mA/A of reading + 300 $\mu$ A	
1 kHz to 5 kHz	0.33 A to 2.199 99 A	7.5 mA/A of reading + 300 $\mu$ A	
Equipment to Output AC Current at the listed frequencies			Fluke 8508A Reference Multimeter
1 Hz to 10 Hz	0.06 $\mu$ A to 199.990 $\mu$ A	500 $\mu$ A/A of reading + 0.02 $\mu$ A	
10Hz - 10 kHz	0.06 $\mu$ A to 199.990 $\mu$ A	500 $\mu$ A/A of reading + 0.02 $\mu$ A	
10 kHz - 30 kHz	0.06 $\mu$ A to 199.990 $\mu$ A	710 $\mu$ A/A of reading + 0.02 $\mu$ A	
30 kHz - 100 kHz	0.06 $\mu$ A to 199.990 $\mu$ A	4 mA/A of reading + 0.02 $\mu$ A	



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Equipment to Output AC Current at the listed frequencies			Fluke 8508A Reference Multimeter
1 Hz to 10 Hz	200 $\mu$ A to 1.999 900 mA	310 $\mu$ A/A of reading + 0.2 $\mu$ A	
10Hz - 10 kHz	200 $\mu$ A to 1.999 900 mA	300 $\mu$ A/A of reading + 0.2 $\mu$ A	
10 kHz - 30 kHz	200 $\mu$ A to 1.999 900 mA	710 $\mu$ A/A of reading + 0.2 $\mu$ A	
30 kHz - 100 kHz	200 $\mu$ A to 1.999 900 mA	4 mA/A of reading + 0.2 $\mu$ A	
Equipment to Output AC Current at the listed frequencies			
1 Hz to 10 Hz	2 mA to 19.999 900 mA	310 $\mu$ A/A of reading + 2 $\mu$ A	
10Hz - 10 kHz	2 mA to 19.999 900 mA	300 $\mu$ A/A of reading + 2 $\mu$ A	
10 kHz - 30 kHz	2 mA to 19.999 900 mA	710 $\mu$ A/A of reading + 2 $\mu$ A	
30 kHz - 100 kHz	2 mA to 19.999 900 mA	4 mA/A of reading + 2 $\mu$ A	
Equipment to Output AC Current at the listed frequencies			
1 Hz to 10 Hz	20 mA to 199.990 0 mA	310 $\mu$ A/A of reading + 20 $\mu$ A	
10Hz - 10 kHz	20 mA to 199.990 0 mA	290 $\mu$ A/A of reading + 20 $\mu$ A	
10 kHz - 30 kHz	20 mA to 199.990 0 mA	625 $\mu$ A/A of reading + 20 $\mu$ A	
Equipment to Output AC Current at the listed frequencies			
1 Hz to 10 Hz	200 mA to 1.999 900 A	620 $\mu$ A/A of reading + 200 $\mu$ A	
10Hz - 10 kHz	200 mA to 1.999 900 A	735 $\mu$ A/A of reading + 200 $\mu$ A	
10 kHz - 30 kHz	200 mA to 1.999 900 A	3 mA/A of reading + 200 $\mu$ A	
Equipment to Output AC Current at the listed frequencies			
1 Hz to 10 Hz	2 A to 19.999 00 A	820 $\mu$ A/A of reading + 2 mA	
10Hz - 10 kHz	2 A to 19.999 00 A	2.5 mA/A of reading + 2 mA	



# Certificate of Accreditation: Supplement

## Pharmaceutical Calibrations and Instrumentation, LLC

8100 Brownleigh Dr., #100A, Raleigh, NC 27617  
 Steve Hilker Phone: 919-781-7787

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

### Electrical

MEASURED INSTRUMENT, QUANTITY OR GAUGE	RANGE (AND SPECIFICATION WHERE APPROPRIATE)	CALIBRATION AND MEASUREMENT CAPABILITY EXPRESSED AS AN UNCERTAINTY ( $\pm$ )	CALIBRATION EQUIPMENT AND REFERENCE STANDARDS USED
Temperature Calibration, Indication, and Control Equipment used with Thermocouple (Type B)	600 °C to 800 °C	0.44 °C	Electrical Simulation of Thermocouple Output Fluke 5500A-SC300 Calibrator
	800 °C to 1000 °C	0.34 °C	
	1000 °C to 1550 °C	0.30 °C	
	1550 °C to 1820 °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 1000 °C	0.31 °C	
	1000 °C to 1800 °C	0.50 °C	
Temperature Calibration, Indication, and Control Equipment used with Thermocouple (Type E)	1800 °C to 2316 °C	0.84 °C	
	-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	0.16 °C	
Temperature Calibration, Indication, and Control Equipment used with Thermocouple (Type J)	650 °C to 1000 °C	0.21 °C	
	-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	
Temperature Calibration, Indication, and Control Equipment used with Thermocouple (Type K)	760 °C to 1200 °C	0.23 °C	
	-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 1000 °C	0.26 °C	
Temperature Calibration, Indication, and Control Equipment used with Thermocouple (Type L)	1000 °C to 1372 °C	0.40 °C	Fluke 5500A-SC300 Calibrator
	-200 °C to -100 °C	0.37 °C	
Temperature Calibration, Indication, and Control Equipment used with Thermocouple (Type N)	-100 °C to 800 °C	0.26 °C	
	-200 °C to -100 °C	0.40 °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 1300 °C	0.27 °C	



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Temperature Calibration, Indication, and Control Equipment used with Thermocouple (Type R)	0 °C to 250 °C	0.57 °C	Fluke 5500A-SC300 Calibrator
	250 °C to 400 °C	0.37 °C	
	400 °C to 1000 °C	0.33 °C	
	1000 °C to 1767 °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 400 °C	0.36 °C	
	400 °C to 1000 °C	0.37 °C	
	1000 °C to 1767 °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 Thermocouple (Type U)	-200 °C to 0 °C	0.56 °C	
	0 °C to 600 °C	0.27 °C	
Temperature Calibration, Indication, and Control Equipment used with RTD (Pt 385) 100 $\Omega$	-200 °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	
Temperature Calibration, Indication, and Control Equipment used with RTD (Pt 3926) 100 $\Omega$	-200 °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 $\Omega$	-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	0.09 °C	
	300 °C to 400 °C	0.10 °C	
	400 °C to 600 °C	0.12 °C	
	600 °C to 630 °C	0.23 °C	



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Temperature Calibration, Indication, and Control Equipment used with RTD (Pt 385) 200 $\Omega$	-200 °C to 100 °C	0.04 °C	Fluke 5500A-SC300 Calibrator
	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 $\Omega$	-200 °C to -80 °C	0.04 °C	
	-80 °C to 100 °C	0.05 °C	
	100 °C to 260 °C	0.06 °C	
	260 °C to 400 °C	0.08 °C	
	400 °C to 600 °C	0.09 °C	
	600 °C to 630 °C	0.11 °C	
Temperature Calibration, Indication, and Control Equipment used with RTD (Pt 385) 1000 $\Omega$	-190 °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 600 °C	0.07 °C	
	600 °C to 630 °C	0.23 °C	
Temperature Calibration, Indication, and Control Equipment used with RTD (Ni 385) 120 $\Omega$	-80 °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	
Volts	1.8 mV to 105 V pk-pk	2.5 mV/V of reading + 100 $\mu$ V	
Leveled Sine Wave - Flatness	50 kHz Reference	20 mV/V of reading + 200 $\mu$ V	
	50 kHz to 100 MHz	15 mV/V of reading + 100 $\mu$ V	
	100 MHz to 300 MHz	20 mV/V of reading + 100 $\mu$ V	
Time Markers	2 nS to 1 $\mu$ S	0.002 5 % of reading	
	2 $\mu$ S to 50 $\mu$ S	0.002 5 % of reading + t reading* 1.5%	
	100 $\mu$ S to 5 S	0.002 5% of reading + t reading* 0.01%	



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

1. The CMC (Calibration and Measurement Capability) stated for calibrations included on this scope of accreditation represent the smallest measurement uncertainties attainable by the laboratory when performing a more or less routine calibration of a nearly ideal device under nearly ideal conditions. It is 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.

