



# PERRY JOHNSON LABORATORY ACCREDITATION, INC.

## Certificate of Accreditation

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

***Exphil Calibration Labs, Inc.***  
***415 Central Avenue, Bohemia, NY 11716***

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

**ISO/IEC 17025:2005**

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):

***Calibration of Electrical and Frequency Equipment***  
***(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>
September 4, 2009	November 3, 2011	65940	L11-144

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



# Certificate of Accreditation: Supplement

## Exphil Calibration Labs, Inc.

415 Central Avenue, Bohemia, NY 11716

Steven Pidd Phone: 631-563-3520

Accreditation is granted to the facility to the following calibration:

### 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	1.20 $\mu$ V to 220 mV	7.8 $\mu$ V/V of output + 400 nV	Fluke 5720A
	220mV to 2.2 V	5.6 $\mu$ V/V of output + 700 nV	
	2.2 V to 22 V	3.7 $\mu$ V/V of output + 4 $\mu$ V	
	22 V to 220 V	5 $\mu$ V/V of output + 40 $\mu$ V	
	220 V to 1 000 V	7.4 $\mu$ V/V of output+ 400 $\mu$ V	
	10 V	4.1 $\mu$ V	Fluke 732B
Equipment to Output DC Voltage	500 nV to 200 mV	8 $\mu$ V/V of reading + 100 nV	Fluke 8508A
	200 mV to 2 V	5.5 $\mu$ V/V of reading + 400 nV	
	2 V to 20 V	5.5 $\mu$ V/V of reading + 4 nV	
	20 V to 200 V	8 $\mu$ V/V of reading + 40 nV	
	200 V to 1 000 V	7.5 $\mu$ V/V of reading+ 500 nV	Fluke 80B-5
10 V to 5 000 V	3.3 mV/V of reading		
Equipment to Measure DC Current	18 nA to 220 $\mu$ A	41 $\mu$ A/A of reading + 6 nA	Fluke 5720A
	220 $\mu$ A to 2.2 mA	36 $\mu$ A/A of reading + 7 nA	
	2.2 mA to 22 mA	39 $\mu$ A/A of reading + 40 nA	
	22 mA to 220 mA	45 $\mu$ A/A of reading + 700 nA	
220 mA to 2 A	82 $\mu$ A/A of reading + 12 $\mu$ A		
Equipment to Measure DC Current	1 A to 11 A	4 mA/A of reading + 480 $\mu$ A	Fluke 5725A
Clamp Meters (DC to 440 Hz)	10 A to 1 025 A	1 % of reading+ 0.9 A	Fluke 5500A w/ coil
Equipment to Output DC Current	1.20 $\mu$ A to 220 $\mu$ A	20 $\mu$ A/A of reading + 400 nA	Fluke 8508A
	200 $\mu$ A to 2 mA	20 $\mu$ A/A of reading + 4 nA	
	2 mA to 20 mA	22 $\mu$ A/A of reading + 40 nA	
	20 mA to 200 mA	60 $\mu$ A/A of reading + 800 nA	
	200 mA to 2 A	285 $\mu$ A/A of reading + 16 $\mu$ A	
Equipment to Measure AC Voltage At the listed frequencies			Fluke 5720A
10 Hz to 20 Hz	220 $\mu$ V to 2.2 mV	1.5 mV/V of reading + 4 $\mu$ V	
20 Hz to 40 Hz	220 $\mu$ V to 2.2 mV	1.1 mV/V of reading + 4 $\mu$ V	
40 Hz to 20 kHz	220 $\mu$ V to 2.2 mV	1.1 mV/V of reading + 4 $\mu$ V	
20 kHz to 50 kHz	220 $\mu$ V to 2.2 mV	1.2 mV/V of reading + 4 $\mu$ V	
50 kHz to 100 kHz	220 $\mu$ V to 2.2 mV	2.4 mV/V of reading + 5 $\mu$ V	
100 kHz to 300 kHz	220 $\mu$ V to 2.2 mV	4.3 mV/V of reading + 10 $\mu$ V	
300 kHz to 500 kHz	220 $\mu$ V to 2.2 mV	6.4 mV/V of reading + 20 $\mu$ V	
500 kHz to 1 MHz	220 $\mu$ V to 2.2 mV	7.7 mV/V of the reading + 20 $\mu$ V	



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Equipment to Measure AC Voltage At the listed frequencies			Fluke 5720A
10 Hz to 20 Hz	2.2 mV to 22 mV	2.5 mV/V of reading + 4 $\mu$ V	
20 Hz to 40 Hz	2.2 mV to 22 mV	1.1 mV/V of reading + 4 $\mu$ V	
40 Hz to 20 kHz	2.2 mV to 22 mV	7.3 mV/V of reading + 4 $\mu$ V	
20 kHz to 50 kHz	2.2 mV to 22 mV	2.5 mV/V of reading + 4 $\mu$ V	
50 kHz to 100 kHz	2.2 mV to 22 mV	55 mV/V of reading + 5 $\mu$ V	
100 kHz to 300 kHz	2.2 mV to 22 mV	11 mV/V of reading + 10 $\mu$ V	
300 kHz to 500 kHz	2.2 mV to 22 mV	1.5 mV/V of reading + 20 $\mu$ V	
500 kHz to 1 MHz	2.2 mV to 22 mV	2.7 mV/V of reading + 20 $\mu$ V	
Equipment to Measure AC Voltage At the listed frequencies			Fluke 5720A
10 Hz to 20 Hz	22 mV to 220 mV	240 $\mu$ V/V of reading + 12 $\mu$ V	
20 Hz to 40 Hz	22 mV to 220 mV	90 $\mu$ V/V of reading + 7 $\mu$ V	
40 Hz to 20 kHz	22 mV to 220 mV	81 $\mu$ V/V of reading + 7 $\mu$ V	
20 kHz to 50 kHz	22 mV to 220 mV	204 $\mu$ V/V of reading + 7 $\mu$ V	
50 kHz to 100 kHz	22 mV to 220 mV	460 $\mu$ V/V of reading + 17 $\mu$ V	
100 kHz to 300 kHz	22 mV to 220 mV	909 $\mu$ V/V of reading + 20 $\mu$ V	
300 kHz to 500 kHz	22 mV to 220 mV	1.4 mV/V of reading + 25 $\mu$ V	
500 kHz to 1 MHz	22 mV to 220 mV	2.7 mV/V of reading + 45 $\mu$ V	
Equipment to Measure AC Voltage At the listed frequencies			Fluke 5720A
10 Hz to 20 Hz	0.22 V to 2.2 V	295 $\mu$ V/V of reading + 40 $\mu$ V	
20 Hz to 40 Hz	0.22 V to 2.2 V	122 $\mu$ V/V of reading + 15 $\mu$ V	
40 Hz to 20 kHz	0.22 V to 2.2 V	82 $\mu$ V/V of reading + 8 $\mu$ V	
20 kHz to 50 kHz	0.22 V to 2.2 V	122 $\mu$ V/V of reading + 10 $\mu$ V	
50 kHz to 100 kHz	0.22 V to 2.2 V	131 $\mu$ V/V of reading + 30 $\mu$ V	
100 kHz to 300 kHz	0.22 V to 2.2 V	445 $\mu$ V/V of reading + 80 $\mu$ V	
300 kHz to 500 kHz	0.22 V to 2.2 V	1.1 mV/V of reading + 200 $\mu$ V	
500 kHz to 1 MHz	0.22 V to 2.2 V	1.7 mV/V of reading + 300 $\mu$ V	



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Equipment to Measure AC Voltage At the listed frequencies			Fluke 5720A
10 Hz to 20 Hz	2.2 V to 22 V	240 $\mu$ V/V of reading + 400 $\mu$ V	
20 Hz to 40 Hz	2.2 V to 22 V	90 $\mu$ V/V of reading + 150 $\mu$ V	
40 Hz to 20 kHz	2.2 V to 22 V	45 $\mu$ V/V of reading + 50 $\mu$ V	
20 kHz to 50 kHz	2.2 V to 22 V	82 $\mu$ V/V of reading + 100 $\mu$ V	
50 kHz to 100 kHz	2.2 V to 22 V	109 $\mu$ V/V of reading + 200 $\mu$ V	
100 kHz to 300 kHz	2.2 V to 22 V	290 $\mu$ V/V of reading + 600 $\mu$ V	
300 kHz to 500 kHz	2.2 V to 22 V	1 mV/V of reading + 2 mV	
500 kHz to 1 MHz	2.2 V to 22 V	1.5 mV/V of reading + 3.2 mV	
Equipment to Measure AC Voltage At the listed frequencies			
10 Hz to 20 Hz	22 V to 220 V	240 $\mu$ V/V of reading + 4 mV	
20 Hz to 40 Hz	22 V to 220 V	90 $\mu$ V/V of reading + 1.5 mV	
40 Hz to 20 kHz	22 V to 220 V	55 $\mu$ V/V of reading + 0.6 mV	
20 kHz to 50 kHz	22 V to 220 V	90 $\mu$ V/V of reading + 1 mV	
50 kHz to 100 kHz	22 V to 220 V	159 $\mu$ V/V of reading + 2.5 mV	
Equipment to Measure AC Voltage At the listed frequencies			
50 Hz to 300 Hz	220 V to 700 V	428 $\mu$ V/V of reading + 16 mV	
300 Hz to 1 KHz	220 V to 700 V	108 $\mu$ V/V of reading + 3.5 mV	
Equipment to Output AC Voltage At the listed frequencies			Fluke 8508A
1 Hz to 10 Hz	1 mV to 200 mV	160 $\mu$ V/V of reading + 14 $\mu$ V	
10 Hz to 40 Hz	1 mV to 200 mV	130 $\mu$ V/V of reading + 4 $\mu$ V	
40 Hz to 100 Hz	1 mV to 200 mV	110 $\mu$ V/V of reading + 4 $\mu$ V	
100 Hz to 2 kHz	1 mV to 200 mV	110 $\mu$ V/V of reading + 2 $\mu$ V	
2 kHz to 10 kHz	1 mV to 200 mV	110 $\mu$ V/V of reading + 4 $\mu$ V	
10 kHz to 30 kHz	1 mV to 200 mV	310 $\mu$ V/V of reading + 8 $\mu$ V	
30 kHz to 100 kHz	1 mV to 200 mV	710 $\mu$ V/V of reading + 20 $\mu$ V	



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Equipment to Output AC Voltage At the listed frequencies			Fluke 8508A
1 Hz to 10 Hz	0.2 V to 2 V	140 $\mu$ V/V of reading+ 120 $\mu$ V	
10 Hz to 40 Hz	0.2 V to 2 V	110 $\mu$ V/V of reading + 20 $\mu$ V	
40 Hz to 100 Hz	0.2 V to 2 V	85 $\mu$ V/V of reading + 20 $\mu$ V	
100 Hz to 2 kHz	0.2 V to 2 V	65 $\mu$ V/V of reading + 20 $\mu$ V	
2 kHz to 10 kHz	0.2 V to 2 V	85 $\mu$ V/V of reading + 20 $\mu$ V	
10 kHz to 30 kHz	0.2 V to 2 V	210 $\mu$ V/V of reading + 40 $\mu$ V	
30 kHz to 100 kHz	0.2 V to 2 V	510 $\mu$ V/V of reading + 200 $\mu$ V	
Equipment to Output AC Voltage At the listed frequencies			
1 Hz to 10 Hz	2 V to 20 V	140 $\mu$ V/V of reading + 1.2 mV	
10 Hz to 40 Hz	2 V to 20 V	110 $\mu$ V/V of reading + 200 $\mu$ V	
40 Hz to 100 Hz	2 V to 20 V	85 $\mu$ V/V of reading + 200 $\mu$ V	
100 Hz to 2 kHz	2 V to 20 V	65 $\mu$ V/V of reading + 200 $\mu$ V	
2 kHz to 10 kHz	2 V to 20 V	85 $\mu$ V/V of reading + 200 $\mu$ V	
10 kHz to 30 kHz	2 V to 20 V	210 $\mu$ V/V of reading + 400 $\mu$ V	
30 kHz to 100 kHz	2 V to 20 V	510 $\mu$ V/V of reading + 2 mV	
Equipment to Output AC Voltage At the listed frequencies			
1 Hz to 10 Hz	20 V to 200 V	140 $\mu$ V/V of reading+ 12 mV	
10 Hz to 40 Hz	20 V to 200 V	110 $\mu$ V/V of reading + 2 mV	
40 Hz to 100 Hz	20 V to 200 V	85 $\mu$ V/V of reading + 2 mV	
100 Hz to 2 kHz	20 V to 200 V	65 $\mu$ V/V of reading + 2 mV	
2 kHz to 10 kHz	20 V to 200 V	85 $\mu$ V/V of reading + 2 mV	
10 kHz to 30 kHz	20 V to 200 V	210 $\mu$ V/V of reading + 4 mV	
30 kHz to 100 kHz	20 V to 200 V	510 $\mu$ V/V of reading + 20 mV	
Equipment to Output AC Voltage At the listed frequencies			
1 Hz to 10 Hz	200 V to 1 000 V	140 $\mu$ V/V of reading + 70 mV	
10 Hz to 40 Hz	200 V to 1 000 V	105 $\mu$ V/V of reading + 20 mV	
40 Hz to 1 kHz	200 V to 1 000 V	108 $\mu$ V/V of reading + 20 mV	



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Equipment to Output AC Current At the listed frequencies			Fluke 8508A
1 Hz to 10 Hz	9 $\mu$ A to 200 $\mu$ A	650 $\mu$ A/A of reading + 20 nA	
10 Hz to 10 kHz	9 $\mu$ A to 200 $\mu$ A	650 $\mu$ A/A of reading + 20 nA	
10 kHz to 30 kHz	9 $\mu$ A to 200 $\mu$ A	650 $\mu$ A/A of reading + 20 nA	
30 kHz to 100 kHz	9 $\mu$ A to 200 $\mu$ A	4 mA/A of reading + 20 nA	
Equipment to Output AC Current At the listed frequencies			
1 Hz to 10 Hz	0.2 mA to 2 mA	650 $\mu$ A/A of reading + 200 nA	
10 Hz to 10 kHz	0.2 mA to 2 mA	650 $\mu$ A/A of reading + 200 nA	
10 kHz to 30 kHz	0.2 mA to 2 mA	650 $\mu$ A/A of reading + 200 nA	
30 kHz to 100 kHz	0.2 mA to 2 mA	4 mA/A of reading + 200 nA	
Equipment to Output AC Current At the listed frequencies			
1 Hz to 10 Hz	2 mA to 20 mA	700 $\mu$ A/A of reading + 2 $\mu$ A	
10 Hz to 10 kHz	2 mA to 20 mA	700 $\mu$ A/A of reading + 2 $\mu$ A	
10 kHz to 30 kHz	2 mA to 20 mA	650 $\mu$ A/A of reading + 2 $\mu$ A	
30 kHz to 100 kHz	2 mA to 20 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 200 mA	600 $\mu$ A/A of reading + 20 $\mu$ A	
10 Hz to 10 kHz	20 mA to 200 mA	600 $\mu$ A/A of reading + 20 $\mu$ A	
10 kHz to 30 kHz	20 mA to 200 mA	600 $\mu$ A/A of reading + 20 $\mu$ A	
Equipment to Output AC Current At the listed frequencies			
10 Hz to 2 kHz	0.2 A to 2 A	1.3 mA/A of reading + 200 $\mu$ A	
2 kHz to 10 kHz	0.2 A to 2 A	1.5 mA/A of reading + 200 $\mu$ A	
10 kHz to 30 kHz	0.2 A to 2 A	3.1 mA/A of reading + 200 $\mu$ A	



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Equipment to Measure AC Current At the listed frequencies			Fluke 5720A
10 Hz to 20 Hz	9 $\mu$ A to 220 $\mu$ A	259 $\mu$ A/A of reading + 16 nA	
20 Hz to 40 Hz	9 $\mu$ A to 220 $\mu$ A	168 $\mu$ A/A of reading + 10 nA	
40 Hz to 1 kHz	9 $\mu$ A to 220 $\mu$ A	127 $\mu$ A/A of reading + 8 nA	
1 kHz to 5 kHz	9 $\mu$ A to 220 $\mu$ A	313 $\mu$ A/A of reading + 12 nA	
5 kHz to 10 kHz	9 $\mu$ A to 220 $\mu$ A	1.1 mA/A of reading + 65 nA	
Equipment to Measure AC Current At the listed frequencies			
10 Hz to 20 Hz	0.22 mA to 2.2 mA	255 $\mu$ A/A of reading + 40 nA	
20 Hz to 40 Hz	0.22 mA to 2.2 mA	164 $\mu$ A/A of reading + 35 nA	
40 Hz to 1 kHz	0.22 mA to 2.2 mA	127 $\mu$ A/A of reading + 35 nA	
1 kHz to 5 kHz	0.22 mA to 2.2 mA	209 $\mu$ A/A of reading + 110 nA	
5 kHz to 10 kHz	0.22 mA to 2.2 mA	1.1 mA/A of reading + 650 nA	
Equipment to Measure AC Current At the listed frequencies			
10 Hz to 20 Hz	2.2 mA to 22 mA	259 $\mu$ A of reading + 400 nA	
20 Hz to 40 Hz	2.2 mA to 22 mA	163 $\mu$ A/A of reading + 350 nA	
40 Hz to 1 kHz	2.2 mA to 22 mA	127 $\mu$ A/A of reading + 350 nA	
1 kHz to 5 kHz	2.2 mA to 22 mA	259 $\mu$ A/A of reading + 550 nA	
5 kHz to 10 kHz	2.2 mA to 22 mA	1.1 mA/A of reading + 5 $\mu$ A	
Equipment to Measure AC Current At the listed frequencies			
10 Hz to 20 Hz	22 mA to 220 mA	277 $\mu$ A of reading + 4 $\mu$ A	
20 Hz to 40 Hz	22 mA to 220 mA	168 $\mu$ A/A of reading + 3.5 $\mu$ A	
40 Hz to 1 kHz	22 mA to 220 mA	127 $\mu$ A/A of reading + 2.5 $\mu$ A	
1 kHz to 5 kHz	22 mA to 220 mA	209 $\mu$ A/A of reading + 3.5 $\mu$ A	
5 kHz to 10 kHz	22 mA to 220 mA	1.1 mA/A of reading + 10 $\mu$ A	
Equipment to Measure AC Current At the listed frequencies			
20 Hz to 1 kHz	0.22 A to 2.2 A	268 $\mu$ A/A of reading + 35 $\mu$ A	
1 kHz to 5 kHz	0.22 A to 2.2 A	500 $\mu$ A/A of reading + 80 $\mu$ A	
5 kHz to 10 kHz	0.22 A to 2.2 A	7 mA/A of reading + 160 $\mu$ A	



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Equipment to Measure AC Current At the listed frequencies			w/ Fluke 5725A
40 Hz to 1 kHz	2.2 A to 11A	13 mA/A of reading + 380 $\mu$ A	
1 kHz to 10 kHz	2.2 A to 11A	37 mA/A of reading + 750 $\mu$ A	
Equipment to Output AC Current At the listed frequencies			Ballantine 1620A
DC to 10 kHz	10 $\mu$ A to 200 $\mu$ A	0.5 $\mu$ A	
DC to 10 kHz	200 $\mu$ A to 2 mA	5 $\mu$ A	
DC to 10 kHz	2 mA to 20 mA	50 $\mu$ A	
DC to 5 kHz	20 mA to 200 mA	500 $\mu$ A	
DC to 10 kHz	200 mA to 2 A	5 mA	
DC to 1 kHz	2 A to 20 A	50 mA	
DC to 1 kHz	20 A to 100 A	290 mA	
Equipment to Measure DC Current	1 $\mu$ A to 20 mA	30 $\mu$ A	
	20 mA to 200 mA	300 $\mu$ A	
	200 mA to 2 A	4.4 mA	
	2 A to 20 A	44 mA	
	20 A to 100 A	220 mA	
Equipment to Measure DC Voltage	1 001 V to 10 000V	200 $\mu$ V/V	Fluke 80E Voltage Divider
Equipment to Output AC Current At the listed frequencies			Leeds and Northrup 4360
DC to 60 Hz	10 $\mu$ A to 15 A	0.46 mA/A	
DC to 60 Hz	1 mA to 100 A	0.41 mA/A	
			Leeds and Northrup 4361



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Equipment to Measure Resistance	1 $\Omega$	100 $\mu\Omega$	Fluke 5720A
	10 $\Omega$	960 $\mu\Omega$	
	100 $\Omega$	2.4 m $\Omega$	
	1 k $\Omega$	9.2 m $\Omega$	
	10 k $\Omega$	91 m $\Omega$	
	100 k $\Omega$	12 $\Omega$	
	1 M $\Omega$	21 $\Omega$	
	10 M $\Omega$	420 $\Omega$	
	100 M $\Omega$	11 k $\Omega$	
	1 $\Omega$	1.2 $\mu\Omega$	
10 k $\Omega$	10 m $\Omega$	Fluke 742A-10K	
Equipment to Output Resistance	12 $\mu\Omega$ to 2 $\Omega$	26 $\mu\Omega/\Omega$ of range + 4 $\mu\Omega$	Fluke 8508A
	2 $\Omega$ to 20 $\Omega$	15 $\mu\Omega/\Omega$ of range + 14 $\mu\Omega$	
	20 $\Omega$ to 200 $\Omega$	13 $\mu\Omega/\Omega$ of range + 50 $\mu\Omega$	
	200 $\Omega$ to 2 k $\Omega$	13 $\mu\Omega/\Omega$ of range + 0.5 m $\Omega$	
	2 k $\Omega$ to 20 k $\Omega$	13 $\mu\Omega/\Omega$ of range + 5 m $\Omega$	
	20 k $\Omega$ to 200 k $\Omega$	13 $\mu\Omega/\Omega$ of range + 50 m $\Omega$	
	200 k $\Omega$ to 2 M $\Omega$	15 $\mu\Omega/\Omega$ of range + 1 $\Omega$	
	2 M $\Omega$ to 20 M $\Omega$	35 $\mu\Omega/\Omega$ of range + 100 $\Omega$	
20 M $\Omega$ to 200 M $\Omega$	205 $\mu\Omega/\Omega$ of range + 10 k $\Omega$		
Oscilloscopes At the listed frequencies			Fluke 5820A
Square 50 $\Omega$ @ 1 kHz Source	1 mV to 130 V	0.25 % of output + 40 $\mu$ V	
Square 1 M $\Omega$ @ 1 kHz Source	1 mV to 130 V	0.09 % of output + 5 $\mu$ V	
Leveled Sine Amplitude 50 kHz Reference	50 kHz to 100 MHz	3.5 % of output + 300 $\mu$ V	
	100 MHz to 300 MHz	4.0 % of output + 300 $\mu$ V	
	300 MHz to 500 MHz	5.5 % of output + 300 $\mu$ V	
Leveled Sine Amplitude 10 MHz Reference	500 MHz to 600 MHz	6.0 % of output + 300 $\mu$ V	
	600 MHz to 1.1 GHz	7.0 % of output + 300 $\mu$ V	
	1.1 GHz to 1.6 GHz	7.0 % of output + 300 $\mu$ V	
	1.6 GHz to 2.1 GHz	8.0 % of output + 300 $\mu$ V	



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Leveled Sine Flatness Relative to 50 kHz	50 kHz to 100 MHz	3.1 % of output + 100 $\mu$ V	Fluke 5820A
	100 MHz to 300 MHz	3.7 % of output + 100 $\mu$ V	
	300 MHz to 500 MHz	4.3 % of output + 100 $\mu$ V	
Leveled Sine Flatness Relative to 10 MHz	500 MHz to 600 MHz	7.4 % of output + 100 $\mu$ V	Fluke 5820A
	600 MHz to 1.1 GHz	8.0 % of output + 100 $\mu$ V	
	1.1 GHz to 1.6 GHz	7.9 % of output + 100 $\mu$ V	
	1.6 GHz to 2.1 GHz	9.3 % of output + 100 $\mu$ V	
Time Marker 50 $\Omega$	5 s to 50 ms	1.2 $\mu$ s	Fluke 5820A
	20 ms to 100 ns	1.2e-16 s	
	50 ns to 20 ns	2.1e-17 s	
	10 ns(5 to 2) ns	1.2e-17 s	
	5 ns to 500 ps	4.1e-18 s	
Equipment to Measure Capacitance @ 1 kHz	11 aF to 1.1 uF	0.017 % of reading + 0.000 03 pF	Gen Rad 1615-A
Equipment to Measure Capacitance @ 1 kHz	1 pF	0.041 pF	HP 16380A Capacitor Set
	10 pF	3.9 fF	
	100 pF	39.0 fF	
	1 000 pF	0.41 pF	HP 16385A HP 16387A
	10 000 pF	4.0 pF	
	1 $\mu$ F	0.5 nF	
Equipment to Measure Inductance (12 Hz to 100 kHz)	0 to 1 mH	210 $\mu$ H/H	GenRad 1689 M
	1 mH to 10 mH	210 $\mu$ H/H	
	10 mH to 100 mH	210 $\mu$ H/H	
	100 mH to 1 H	230 $\mu$ H/H	
	1 H to 10 H	2 500 $\mu$ H/H	
Equipment to Measure Inductance Fixed Points (100 Hz to 1 kHz)	100 uH	0.26 $\mu$ H	GenRad 1482 B
	1 mH	0.25 $\mu$ H	GenRad 1482 E
	10 mH	3.1 $\mu$ H	GenRad 1482 H
	100 mH	31 $\mu$ H	GenRad 1482 L
	1 H	310 $\mu$ H	GenRad 1482 P



# Certificate of Accreditation: Supplement

## Exphil Calibration Labs, Inc.

415 Central Avenue, Bohemia, NY 11716  
Steven Pidd Phone: 631-563-3520

Accreditation is granted to the facility to the following calibration:

### 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 J	-210 °C to -100 °C	0.22 °C	Electrical Simulation of Thermocouple Output Martel 3001M
	-100 °C to -30 °C	0.2 °C	
	-30 °C to 150 °C	0.2 °C	
	150 °C to 760 °C	0.16 °C	
	760 °C to 1 200 °C	0.19 °C	
Temperature Calibration, Indication and Control Equipment used with Thermocouple Type K	-200 °C to -100 °C	0.26 °C	
	-100 °C to 25 °C	0.2 °C	
	25 °C to 120 °C	0.16 °C	
	120 °C to 1 000 °C	0.22 °C	
Temperature Calibration, Indication and Control Equipment used with Thermocouple Type E	1 000 °C to 1 372 °C	0.31 °C	
	-250 °C to -100 °C	0.4 °C	
	-100 °C to -25 °C	0.16 °C	
	-25 °C to 350 °C	0.14 °C	
	350 °C to 650 °C	0.14 °C	
Temperature Calibration, Indication and Control Equipment used with Thermocouple Type T	650 °C to 1000 °C	0.17 °C	
	-250 °C to -150 °C	0.54 °C	
	-150 °C to 0 °C	0.2 °C	
	0 °C to 120 °C	0.17 °C	
Temperature Calibration, Indication and Control Equipment used with Thermocouple Type R	120 °C to 400 °C	0.15 °C	
	0 °C to 250 °C	0.58 °C	
	250 °C to 400 °C	0.34 °C	
	400 °C to 1 000 °C	0.31 °C	
Temperature Calibration, Indication and Control Equipment used with Thermocouple Type S	1 000 °C to 1 750 °C	0.3 °C	
	0 °C to 250 °C	0.56 °C	
	250 °C to 1 000 °C	0.36 °C	
	1 000 °C to 1 400 °C	0.31 °C	
Temperature Calibration, Indication and Control Equipment used with RTD Source Pt385, 100Ω	1 400 °C to 1 750 °C	0.30 °C	Electrical Simulation of RTD Output Martel 3001M Electrical Simulation of RTD Output Martel 3001M
	-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 300 °C	0.04 °C	
	300 °C to 400 °C	0.04 °C	
	400 °C to 630 °C	0.05 °C	
630 °C to 800 °C	0.05 °C		

### Time and Frequency



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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 Output Frequency	10 Hz to 500 MHz	$1.5 \times 10^{-12} + 1 \text{ Hz}$	HP 5343A
	500 MHz to 26.5 GHz	$1.5 \times 10^{-12} + 1 \text{ Hz}$	
Equipment to Measure Frequency	10 MHz	$1.2 \times 10^{-12} \text{ Hz}$	Ball MRT-350 Hewlett Packard 58503A GPS
	10 MHz	$1.2 \times 10^{-12} \text{ Hz}$	

- 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.

