



# PERRY JOHNSON LABORATORY ACCREDITATION, INC.

## *Certificate of Accreditation*

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

***Enviren Calibrations***  
202 State Street, Binghamton, NY 13905

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

**ISO/IEC 17025:2005  
& Meets the Requirements of ANSI/NCCL Z540.3-2006**

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 and Thermodynamic Instruments***  
*(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

*Initial Accreditation Date:*

April 8, 2014

*Issue Date:*

May 5, 2016

*Expiration Date:*

July 31, 2018

*Accreditation No.:*

76664

*Certificate No.:*

L16-197

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

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



# Certificate of Accreditation: Supplement

## Enviren Calibrations

202 State Street, Binghamton, NY 13905  
 Contact Name: David Carter Phone: 607-723-0999

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 Measure DC Voltage <sup>F</sup>	0 mV to 329.999 9 mV	0.001 6 % of value + 0.00081 mV	Fluke 5520A
	0 V to 3.299 999 V	0.000 46 % of value + 0.021 mV	
	0 V to 32.999 99 V	0.000 84 % of value + 0.067 mV	
	30 V to 329.999 9 V	0.0014 % of value + 0.12 mV	
	100 V to 1 000 V	0.0014 % of value + 1.9 mV	
Equipment to Measure Resistance <sup>F</sup>	0 $\mu$ A to 329.999 $\mu$ A	0.012 % of value + 0.016 $\mu$ A	
	0 mA to 3.299 99 mA	0.007 5 % of value + 0.05 $\mu$ A	
	0 mA to 32.999 9 mA	0.007 4 % of value + 0.34 $\mu$ A	
	0 mA to 329.999 mA	0.006 5 % of value + 6.9 $\mu$ A	
	0 A to 1.099 99 A	0.015 % of value + 0.038 mA	
	1.1 A to 2.999 99 A	0.028 % of value + 0.1 mA	
	0 A to 10.999 9 A	0.036 % of value + 0.73 mA	
	11 A to 20.5A	0.077 % of value + 0.79 mA	
	0 $\Omega$ to 10.999 9 $\Omega$	0.003 1 % of value + 0.000 78 $\Omega$	
	11 $\Omega$ to 32.9 $\Omega$	0.002 4 % of value + 0.001 2 $\Omega$	
	33 $\Omega$ to 109.999 9 $\Omega$	0.002 2 % of value + 0.001 1 $\Omega$	
	110 $\Omega$ to 329.999 9 $\Omega$	0.002 2 % of value + 0.001 6 $\Omega$	
	330 k $\Omega$ to 1.099 999 k $\Omega$	0.002 2 % of value + 0.001 5 $\Omega$	
	110 $\Omega$ to 329.999 9 $\Omega$	0.002 4 % of value + 0.014 $\Omega$	
	330 k $\Omega$ to 1.099 999 k $\Omega$	0.002 3 % of value + 0.016 $\Omega$	
	1.1 k $\Omega$ to 3.299 999 k $\Omega$	0.002 3 % of value + 0.15 $\Omega$	
	3.3 k $\Omega$ to 10.999 99 k $\Omega$	0.002 3 % of value + 0.000 15 k $\Omega$	
	11 k $\Omega$ to 32.999 99 k $\Omega$	0.002 6 % of value + 0.001 5 k $\Omega$	
	33 k $\Omega$ to 109.999 9 k $\Omega$	0.25 % of value + 1.6 $\Omega$	
	110 k $\Omega$ to 329.999 9 M $\Omega$	0.48 % of value + 22 $\Omega$	
	330 k $\Omega$ to 1.099 999 M $\Omega$	0.01 % of value + 0.039 k $\Omega$	
	1.1 M $\Omega$ to 3.299 999 M $\Omega$	0.021 % of value + 0.001 8 M $\Omega$	
	3.3 M $\Omega$ to 10.999 99 M $\Omega$	0.04 % of value + 0.002 1 M $\Omega$	
	11 M $\Omega$ to 32.999 99 M $\Omega$	0.24 % of value + 0.075 M $\Omega$	
	33 M $\Omega$ to 109.999 9 M $\Omega$	0.27 % of value + 23 M $\Omega$	
	110 M $\Omega$ to 329.999 M $\Omega$	0.003 1 % of value + 0.000 78 $\Omega$	
	330 M $\Omega$ to 1 100 M $\Omega$	0.002 4 % of value + 0.001 2 $\Omega$	





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Equipment to Measure AC Voltage at the listed frequencies <sup>F</sup>			Fluke 5520A
10 Hz to 45 Hz	1 mV to 32.999 mV	0.06 % of value + 0.005 5 mV	
45 Hz to 10 kHz	1 mV to 32.999 mV	0.008 3 % of value + 0.007 9 mV	
10 kHz to 20 kHz	1 mV to 32.999 mV	0.006 9 % of value + 0.011 mV	
20 kHz to 50 kHz	1 mV to 32.999 mV	0.061 % of value + 0.013 mV	
50 kHz to 100 kHz	1 mV to 32.999 mV	0.27 % of value + 0.012 mV	
100 kHz to 500 kHz	1 mV to 32.999 mV	0.13 % of value + 0.33 mV	
Equipment to Measure AC Voltage at the listed frequencies <sup>F</sup>			
10 Hz to 45 Hz	33 mV to 329.999 mV	0.023 % of value + 0.009 3 mV	
45 Hz to 10 kHz	33 mV to 329.999 mV	0.01 % of value + 0.01 mV	
10 kHz to 20 kHz	33 mV to 329.999 mV	0.012 % of value + 0.01 mV	
20 kHz to 50 kHz	33 mV to 329.999 mV	0.025 % of value + 0.013 mV	
50 kHz to 100 kHz	33 mV to 329.999 mV	0.061 % of value + 0.031 mV	
100 kHz to 500 kHz	33 mV to 329.999 mV	0.15 % of value + 0.082 mV	
Equipment to Measure AC Voltage at the listed frequencies <sup>F</sup>			
10 Hz to 45 Hz	0.33 V to 3.299 99 V	0.022 % of value + 0.074 mV	
45 Hz to 10 kHz	0.33 V to 3.299 99 V	0.011 % of value + 0.093 mV	
10 kHz to 20 kHz	0.33 V to 3.299 99 V	0.014 % of value + 0.087 mV	
20 kHz to 50 kHz	0.33 V to 3.299 99 V	0.022 % of value + 0.087 mV	
50 kHz to 100 kHz	0.33 V to 3.299 99 V	0.053 % of value + 0.16 mV	
100 kHz to 500 kHz	0.33 V to 3.299 99 V	0.18 % of value + 0.84 mV	
Equipment to Measure AC Voltage at the listed frequencies <sup>F</sup>			
10 Hz to 45 Hz	3.3 V to 32.999 9 V	0.022 % of value + 0.82 mV	
45 Hz to 10 kHz	3.3 V to 32.999 9 V	0.011 % of value + 0.9 mV	
10 kHz to 20 kHz	3.3 V to 32.999 9 V	0.018 % of value + 0.84 mV	
20 kHz to 50 kHz	3.3 V to 32.999 9 V	0.026 % of value + 1 mV	
50 kHz to 100 kHz	3.3 V to 32.999 9 V	0.068 % of value + 2 mV	





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Equipment to Measure AC Voltage at the listed frequencies <sup>F</sup>			Fluke 5520A
45 Hz to 1 kHz	33 V to 329.999 V	0.013 % of value + 9.5 mV	
1 kHz to 10 kHz	33 V to 329.999 V	0.014 % of value + 11 mV	
10 kHz to 20 kHz	33 V to 329.999 V	0.014 % of value + 11 mV	
20 kHz to 50 kHz	33 V to 329.999 V	0.018 % of value + 26 mV	
50 kHz to 100 kHz	33 V to 329.999 V	0.14 % of value + 100 mV	
Equipment to Measure AC Voltage at the listed frequencies <sup>F</sup>			
45 Hz to 1 kHz	330 V to 1 000 V	0.022 % of value + 20 mV	
1 kHz to 5 kHz	330 V to 1 000 V	0.019 % of value + 19 mV	
5 kHz to 10 kHz	330 V to 1 000 V	0.023 % of value + 18 mV	
Equipment to Measure AC Current at the listed frequencies <sup>F</sup>			
10 Hz to 20 Hz	29 $\mu$ A to 329.99 $\mu$ A	0.15 % of value + 0.096 $\mu$ A	
20 Hz to 45 Hz	29 $\mu$ A to 329.99 $\mu$ A	0.12 % of value + 0.093 $\mu$ A	
45 Hz to 1 kHz	29 $\mu$ A to 329.99 $\mu$ A	0.095 % of value + 0.096 $\mu$ A	
1 kHz to 5 kHz	29 $\mu$ A to 329.99 $\mu$ A	0.23 % of value + 0.41 $\mu$ A	
5 kHz to 10 kHz	29 $\mu$ A to 329.99 $\mu$ A	0.23 % of value + 0.41 $\mu$ A	
10 kHz to 30 kHz	29 $\mu$ A to 329.99 $\mu$ A	1.2 % of value + 2.2 $\mu$ A	
Equipment to Measure AC Current at the listed frequencies <sup>F</sup>			
10 Hz to 20 Hz	0.33 mA to 3.299 9	0.15 % of value + 0.000 3 mA	
20 Hz to 45 Hz	0.33 mA to 3.299 9	0.087 % of value + 0.000 53 mA	
45 Hz to 1 kHz	0.33 mA to 3.299 9	0.073 % of value + 0.000 31 mA	
1 kHz to 5 kHz	0.33 mA to 3.299 9	0.15 % of value + 0.000 65 mA	
5 kHz to 10 kHz	0.33 mA to 3.299 9	0.38 % of value + 0.000 84 mA	
10 kHz to 30 kHz	0.33 mA to 3.299 9	0.76 % of value + 0.003 7 mA	
Equipment to Measure AC Current at the listed frequencies <sup>F</sup>			
10 Hz to 20 Hz	3.3 mA to 32.999 mA	0.14 % of value + 0.003 mA	
20 Hz to 45 Hz	3.3 mA to 32.999 mA	0.065 % of value + 0.003 4 mA	
45 Hz to 1 kHz	3.3 mA to 32.999 mA	0.026 % of value + 0.003 7 mA	
1 kHz to 5 kHz	3.3 mA to 32.999 mA	0.056 % of value + 0.004 3 mA	
5 kHz to 10 kHz	3.3 mA to 32.999 mA	0.14 % of value + 0.006 9 mA	
10 kHz to 30 kHz	3.3 mA to 32.999 mA	0.28 % of value + 0.017 mA	





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Equipment to Measure AC Current at the listed frequencies <sup>F</sup>			Fluke 5520A
10 Hz to 20 Hz	33 mA to 329.99 mA	0.14 % of value + 0.031 mA	
20 Hz to 45 Hz	33 mA to 329.99 mA	0.065 % of value + 0.036 mA	
45 Hz to 1 kHz	33 mA to 329.99 mA	0.026 % of value + 0.038 mA	
1 kHz to 5 kHz	33 mA to 329.99 mA	0.074 % of value + 0.056 mA	
5 kHz to 10 kHz	33 mA to 329.99 mA	0.15 % of value + 0.11 mA	
10 kHz to 30 kHz	33 mA to 329.99 mA	0.074 % of value + 0.001 2 A	
Equipment to Measure AC Current at the listed frequencies <sup>F</sup>			
10 Hz to 45 Hz	0.33 A to 2.999 99 A	0.008 7 % of value + 0.001 1 A	
45 Hz to 1 kHz	0.33 A to 2.999 99 A	0.45 % of value + 0.001 1 A	
1 kHz to 5 kHz	0.33 A to 2.999 99 A	1.9 % of value + 0.004 A	
5 kHz to 10 kHz	0.33 A to 2.999 99 A	0.13 % of value + 0.000 38 A	
Equipment to Measure AC Current at the listed frequencies <sup>F</sup>			
45 Hz to 100 Hz	3 A to 10.9999 A	0.035 % of value + 0.000 65 A	
100 kHz to 1 kHz	3 A to 10.9999 A	0.46 % of value + 0.000 91 A	
1 kHz to 5 kHz	3 A to 10.9999 A	1.9 % of value + 0.004 A	
Equipment to Measure AC Current at the listed frequencies <sup>F</sup>			
45 Hz to 100 Hz	11 A to 20.5A	0.04 % of value + 0.002 7 A	
100 Hz to 1 kHz	11 A to 20.5A	0.072 % of value + 0.002 5 A	
1 kHz to 5 kHz	11 A to 20.5A	2.3 % of value + 0.001 7 A	
10 to 45 Hz	11 A to 20.5A	0.09 % of value + 0.004 9 A	
45 Hz to 1 000 Hz	11 A to 20.5A	0.11 % of value + 0.004 8 A	
1 kHz to 5 kHz	11 A to 20.5A	2.3 % of value + 0.004 A	
DC Clamp Meters <sup>FO</sup>	20.5 A to 150 A	0.6 % of value + 0.17 A	Fluke 5500A/Coil & Fluke 5520A
	150 A to 1 025 A	0.6 % of value + 0.88 A	
AC Clamp Meter 45 Hz to 65 Hz <sup>FO</sup>	20.5 A to 150 A	0.68 % of value + 0.3 A	Fluke 5500A/Coil & Fluke 5520A
	150 A to 1 025 A	0.67 % of value + 1.2 A	
AC Clamp Meter 65 Hz to 440 Hz <sup>FO</sup>	20.5 A to 150 A	1.2 % of value + 0.3 A	LCOMP OFF
	150 A to 1 025 A	1.2 % of value + 1.2 A	



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Equipment to Measure Capacitance <sup>F</sup>	0.19 nF to 0.399 9 nF	0.34 % of value + 0.008 1 nF	Fluke 5520A
	0.4 nF to 1.099 9 nF	0.38 % of value + 0.008 nF	
	1.1 nF to 3.299 9 nF	0.4 % of value + 0.007 8 nF	
	3.3 nF to 10.999 9 nF	0.19 % of value + 0.009 7 nF	
	11 nF to 32.999 9 nF	0.2 % of value + 0.078 nF	
	33 nF to 109.999 nF	0.19 % of value + 0.091 nF	
	110 nF to 329.999 nF	0.15 % of value + 0.57 nF	
	0.33 $\mu$ F to 1.099 99 $\mu$ F	0.19 % of value + 0.000 91 $\mu$ F	
	1.1 $\mu$ F to 3.299 99 $\mu$ F	0.15 % of value + 0.005 7 $\mu$ F	
	3.3 $\mu$ F to 10.999 9 $\mu$ F	0.2 % of value + 0.008 9 $\mu$ F	
	11 $\mu$ F to 32.999 9 $\mu$ F	0.27 % of value + 0.053 $\mu$ F	
	33 $\mu$ F to 109.999 $\mu$ F	0.36 % of value + 0.083 $\mu$ F	
	110 $\mu$ F to 329.999 $\mu$ F	0.31 % of value + 0.51 $\mu$ F	
	0.33 mF to 1.099 99 mF	0.34 % of value + 0.98 $\mu$ F	
	1.1 mF to 3.299 9 mF	0.3 % of value + 5.2 $\mu$ F	
3.3 mF to 10.999 9 mF	0.35 % of value + 8.8 $\mu$ F		
11 mF to 32.999 9 mF	0.58 % of value + 24 $\mu$ F		
33 mF to 110 mF	0.85 % of value + 78 $\mu$ F		
Temperature Calibration Indication and Control Equipment used with Thermocouple Type B <sup>F</sup>	600 °C to 800 °C	0.37 °C	Electrical Simulation of Thermocouple output Fluke 5520A
	800 °C to 1 000 °C	0.29 °C	
	1 000 °C to 1 550 °C	0.27 °C	
	1 550 °C to 1 820 °C	0.29 °C	
Temperature Calibration Indication and Control Equipment used with Thermocouple Type C <sup>F</sup>	0 °C to 150°C	0.27 °C	
	150 °C to 650 °C	0.24 °C	
	650 °C to 1 000 °C	0.27 °C	
	1 000 °C to 1 800 °C	0.41 °C	
	1 800 °C to 2 316 °C	0.66 °C	
Temperature Calibration Indication and Control Equipment used with Thermocouple Type E <sup>F</sup>	-250 °C to -100 °C	0.41 °C	
	-100 °C to -25 °C	0.18 °C	
	-25 °C to 350 °C	0.17 °C	
	350 °C to 650 °C	0.18 °C	
	650 °C to 1 000 °C	0.20 °C	





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Temperature Calibration Indication and Control Equipment used with Thermocouple Type J <sup>F</sup>	-210 °C to -100 °C	0.25 °C	Electrical Simulation of Thermocouple output Fluke 5520A
	-100 °C to -30 °C	0.18 °C	
	-30 °C to 150 °C	0.17 °C	
	150 °C to 760 °C	0.18 °C	
	760 °C to 1 200 °C	0.22 °C	
Temperature Calibration Indication and Control Equipment used with Thermocouple Type K <sup>F</sup>	-200 °C to -100 °C	0.29 °C	
	-100 °C to -25 °C	0.19 °C	
	-25 °C to 120 °C	0.18 °C	
	120 °C to 1 000 °C	0.24 °C	
	1 000 °C to 1 372 °C	0.33 °C	
Temperature Calibration Indication and Control Equipment used with Thermocouple Type L <sup>F</sup>	-200 °C to -100 °C	0.34 °C	
	-100 °C to 800 °C	0.24 °C	
	800 °C to 900 °C	0.18 °C	
Temperature Calibration Indication and Control Equipment used with Thermocouple Type N <sup>F</sup>	-200 °C to -100 °C	0.34 °C	
	-100 °C to -25 °C	0.21 °C	
	-25 °C to 120 °C	0.19 °C	
	120 °C to 410 °C	0.19 °C	
Temperature Calibration Indication and Control Equipment used with Thermocouple Type R <sup>F</sup>	410 °C to 130 °C	0.24 °C	
	0 °C to 250 °C	0.46 °C	
	250 °C to 400 °C	0.30 °C	
	400 °C to 1 000 °C	0.29 °C	
Temperature Calibration Indication and Control Equipment used with Thermocouple Type S <sup>F</sup>	1 000 °C to 1 767 °C	0.33 °C	
	0 °C to 250 °C	0.39 °C	
	250 °C to 1 000 °C	0.31 °C	
	1 000 °C to 1 400 °C	0.32 °C	
Temperature Calibration Indication and Control Equipment used with Thermocouple Type T <sup>F</sup>	1 400 °C to 1 767 °C	0.38 °C	
	-250 °C to -150 °C	0.51 °C	
	-150 °C to 0 °C	0.22 °C	
	0 °C to 120 °C	0.18 °C	
Temperature Calibration Indication and Control Equipment used with Thermocouple Type U <sup>F</sup>	120 °C to 400 °C	0.16 °C	
	-200 °C to 0 °C	0.56 °C	
	0 °C to 600 °C	0.25 °C	



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Temperature Calibration Indication and Control Equipment used with RTD Type Pt 385,100 $\Omega^F$	-200 °C to -80 °C	0.05 °C	Electrical Simulation of Thermocouple output Fluke 5520A
	-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	
Temperature Calibration Indication and Control Equipment used with RTD Type Pt 3926,100 $\Omega^F$	-200 °C to -80 °C	0.05 °C	
	-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 Type Pt 3916,100 $\Omega^F$	-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 Type Pt 385,200 $\Omega^F$	-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	





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Temperature Calibration Indication and Control Equipment used with RTD Type Pt 385,500 $\Omega^F$	-200 °C to -80 °C	0.04 °C	Electrical Simulation of Thermocouple output Fluke 5520A
	-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	
Temperature Calibration Indication and Control Equipment used with RTD Type Pt 385,1000 $\Omega^F$	-200 °C to -80 °C	0.03 °C	
	-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 Type Ni120,1209 $\Omega^F$	-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 Type Cu 427,10 $\Omega^F$	-100 °C to 260 °C	0.30 °C	
Equipment to simulate the output signal from Thermocouple Type B <sup>F</sup>	600 °C to 800 °C	0.37 °C	Fluke 5520A
	800 °C to 1 000 °C	0.29 °C	
	1 000 °C to 1 550 °C	0.27 °C	
	1 550 °C to 1 820 °C	0.29 °C	
Equipment to simulate the output signal from Thermocouple Type C <sup>F</sup>	0 °C to 150 °C	0.27 °C	
	150 °C to 650 °C	0.24 °C	
	650 °C to 1 000 °C	0.27 °C	
	1 000 °C to 1 800 °C	0.41 °C	
	1 800 °C to 2 316 °C	0.66 °C	

# Certificate of Accreditation: Supplement



## Environ Calibrations

202 State Street, Binghamton, NY 13905  
 Contact Name: David Carter Phone: 607-723-0999

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 (±)	CALIBRATION EQUIPMENT AND REFERENCE STANDARDS USED
Equipment to simulate the output signal from Thermocouple Type E <sup>F</sup>	-250 °C to -100 °C	0.41 °C	Fluke 5520A
Equipment to simulate the output signal from Thermocouple Type E <sup>F</sup>	-100 °C to -25 °C	0.18 °C	
Equipment to simulate the output signal from Thermocouple Type E <sup>F</sup>	-25 °C to 350 °C	0.17 °C	
Equipment to simulate the output signal from Thermocouple Type E <sup>F</sup>	350 °C to 650 °C	0.18 °C	
Equipment to simulate the output signal from Thermocouple Type E <sup>F</sup>	650 °C to 1 000 °C	0.20 °C	
Equipment to simulate the output signal from Thermocouple Type J <sup>F</sup>	-210 °C to -100 °C	0.25 °C	
Equipment to simulate the output signal from Thermocouple Type J <sup>F</sup>	-100 °C to -30 °C	0.18 °C	
Equipment to simulate the output signal from Thermocouple Type J <sup>F</sup>	-30 °C to 150 °C	0.17 °C	
Equipment to simulate the output signal from Thermocouple Type J <sup>F</sup>	150 °C to 760 °C	0.18 °C	
Equipment to simulate the output signal from Thermocouple Type J <sup>F</sup>	760 °C to 1 200 °C	0.22 °C	
Equipment to simulate the output signal from Thermocouple Type K <sup>F</sup>	200 °C to -100 °C	0.29 °C	
Equipment to simulate the output signal from Thermocouple Type K <sup>F</sup>	-100 °C to -25 °C	0.19 °C	
Equipment to simulate the output signal from Thermocouple Type K <sup>F</sup>	-25 °C to 120 °C	0.18 °C	
Equipment to simulate the output signal from Thermocouple Type K <sup>F</sup>	120 °C to 1 000 °C	0.24 °C	
Equipment to simulate the output signal from Thermocouple Type K <sup>F</sup>	1 000 °C to 1 372 °C	0.33 °C	
Equipment to simulate the output signal from Thermocouple Type L <sup>F</sup>	-200 °C to -100 °C	0.34 °C	
Equipment to simulate the output signal from Thermocouple Type L <sup>F</sup>	-100 °C to 800 °C	0.24 °C	
Equipment to simulate the output signal from Thermocouple Type L <sup>F</sup>	800 °C to 900 °C	0.18 °C	
Equipment to simulate the output signal from Thermocouple Type N <sup>F</sup>	-200 °C to -100 °C	0.34 °C	
Equipment to simulate the output signal from Thermocouple Type N <sup>F</sup>	-100 °C to -25 °C	0.21 °C	
Equipment to simulate the output signal from Thermocouple Type N <sup>F</sup>	-25 °C to 120 °C	0.19 °C	
Equipment to simulate the output signal from Thermocouple Type N <sup>F</sup>	120 °C to 410 °C	0.19 °C	
Equipment to simulate the output signal from Thermocouple Type N <sup>F</sup>	410 °C to 130 °C	0.24 °C	
Equipment to simulate the output signal from Thermocouple Type R <sup>F</sup>	0 °C to 250 °C	0.46 °C	
Equipment to simulate the output signal from Thermocouple Type R <sup>F</sup>	250 °C to 400 °C	0.30 °C	
Equipment to simulate the output signal from Thermocouple Type R <sup>F</sup>	400 °C to 1 000 °C	0.29 °C	
Equipment to simulate the output signal from Thermocouple Type R <sup>F</sup>	1 000 °C to 1 767 °C	0.33 °C	
Equipment to simulate the output signal from Thermocouple Type S <sup>F</sup>	0 °C to 250 °C	0.39 °C	
Equipment to simulate the output signal from Thermocouple Type S <sup>F</sup>	250 °C to 1 000 °C	0.31 °C	
Equipment to simulate the output signal from Thermocouple Type S <sup>F</sup>	1 000 °C to 1 400 °C	0.32 °C	
Equipment to simulate the output signal from Thermocouple Type S <sup>F</sup>	1 400 °C to 1 767 °C	0.38 °C	





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## Enviren Calibrations

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### Electrical

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Equipment to simulate the output signal from Thermocouple Type T <sup>F</sup>	-250 °C to -150 °C	0.51 °C	Fluke 5520A
	-150 °C to 0 °C	0.22 °C	
	0 °C to 120 °C	0.18 °C	
	120 °C to 400 °C	0.16 °C	
Equipment to simulate the output signal from Thermocouple Type U <sup>F</sup>	-200 °C to 0 °C	0.56 °C	
	0 °C to 600 °C	0.25 °C	
Equipment to simulate the output signal from RTD Type Pt 385,100 $\Omega$ <sup>F</sup>	-200 °C to -80 °C	0.05 °C	
	-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	0.1 °C	
	400 °C to 630 °C	0.12 °C	
	630 °C to 800 °C	0.23 °C	
Equipment to simulate the output signal from RTD Type Pt 3926,100 $\Omega$ <sup>F</sup>	-200 °C to -80 °C	0.05 °C	
	-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	0.1 °C	
	400 °C to 630 °C	0.12 °C	
Equipment to simulate the output signal from RTD Type Pt 3916,100 $\Omega$ <sup>F</sup>	-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	0.1 °C	
600 °C to 630 °C	0.23 °C		



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Equipment to simulate the output signal from RTD Type Pt 385,200 $\Omega^F$	-80 °C to 0 °C	0.04 °C	Fluke 5520A
	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	
Equipment to simulate the output signal from RTD Type Pt 385,500 $\Omega^F$	-200 °C to -80 °C	0.04 °C	Fluke 5520A
	-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	
Equipment to simulate the output signal from RTD Type Pt 385,1000 $\Omega^F$	-200 °C to -80 °C	0.03 °C	Fluke 5520A
	-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	
Equipment to simulate the output signal from RTD Type Ni120,1209 $\Omega^F$	-80 °C to 0 °C	0.08 °C	Fluke 5520A
	0 °C to 100 °C	0.08 °C	
	100 °C to 260 °C	0.14 °C	
Equipment to simulate the output signal from RTD Type Cu 427,10 $\Omega^F$	-100 °C to 260 °C	0.3 °C	Fluke 5520A





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Equipment to Measure DC Current <sup>F</sup>	200 $\mu$ A	0.001 2 % of value + 0.000 4 $\mu$ A	Fluke 8508A
	2 mA	0.001 2 % of value + 0.004 $\mu$ A	
	20 mA	0.001 3 % of value + 0.04 $\mu$ A	
	200 mA	0.003 6 % of value + 0.8 $\mu$ A	
	2 A	0.017 % of value + 0.16 $\mu$ A	
	20 A	0.038 % of value + 4 $\mu$ A	
Equipment to Measure AC Voltage at the listed frequencies <sup>F</sup>			
1 Hz to 10 Hz	200 mV	0.016 % of value + 14 $\mu$ V	
10 Hz to 40 Hz	200 mV	0.013 % of value + 4 $\mu$ V	
40 Hz to 100 Hz	200 mV	0.011 % of value + 4 $\mu$ V	
100 Hz to 2 kHz	200 mV	0.01 % of value + 2 $\mu$ V	
2 kHz to 10 kHz	200 mV	0.01 % of value + 4 $\mu$ V	
10 kHz to 30 kHz	200 mV	0.03 % of value + 8 $\mu$ V	
30 kHz to 100 kHz	200 mV	0.071 % of value + 20 $\mu$ V	
Equipment to Measure AC Voltage at the listed frequencies <sup>F</sup>			
1 Hz to 10 Hz	2 V	0.014 % of value + 1.2 $\mu$ V	
10 Hz to 40 Hz	2 V	0.011 % of value + 0.2 $\mu$ V	
40 Hz to 100 Hz	2 V	0.008 7 % of value + 0.2 $\mu$ V	
100 Hz to 2 kHz	2 V	0.006 6 % of value + 0.2 $\mu$ V	
2 kHz to 10 kHz	2 V	0.008 6 % of value + 0.2 $\mu$ V	
10 kHz to 30 kHz	2 V	0.021 % of value + 0.4 $\mu$ V	
30 kHz to 100 kHz	2 V	0.051 % of value + 2 $\mu$ V	
100 kHz to 300 kHz	2 V	0.3 % of value + 20 $\mu$ V	
300 MHz to 1 MHz	2 V	1 % of value + 200 $\mu$ V	
Equipment to Measure AC Voltage at the listed frequencies <sup>F</sup>			
1 Hz to 10 Hz	20 V	0.014 % of value + 1.2 $\mu$ V	
10 Hz to 40 Hz	20 V	0.01 % of value + 0.22 $\mu$ V	
40 Hz to 100 Hz	20 V	0.008 5 % of value + 0.22 $\mu$ V	
100 Hz to 2 kHz	20 V	0.006 5 % of value + 0.22 $\mu$ V	
2 kHz to 10 kHz	20 V	0.008 5 % of value + 0.22 $\mu$ V	
10 kHz to 30 kHz	20 V	0.02 % of value + 0.41 $\mu$ V	
30 kHz to 100 kHz	20 V	0.051 % of value + 2 $\mu$ V	
100 kHz to 300 kHz	20 V	0.3 % of value + 20 $\mu$ V	
300 MHz to 1 MHz	20 V	1 % of value + 200 $\mu$ V	



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Equipment to Measure AC Voltage at the listed frequencies <sup>F</sup>			Fluke 8508A
1 Hz to 10 Hz	200 V	0.014 % of value + 120 $\mu$ V	
10 Hz to 40 Hz	200 V	0.01 % of value + 20 $\mu$ V	
40 Hz to 100 Hz	200 V	0.008 5 % of value + 20 $\mu$ V	
100 Hz to 2 kHz	200 V	0.006 5 % of value + 20 $\mu$ V	
2 kHz to 10 kHz	200 V	0.008 5 % of value + 20 $\mu$ V	
10 kHz to 30 kHz	200 V	0.02 % of value + 40 $\mu$ V	
30 kHz to 100 kHz	200 V	0.05 % of value + 200 $\mu$ V	
100 kHz to 300 kHz	200 V	0.3 % of value + 2 000 $\mu$ V	
300 MHz to 1 MHz	200 V	1 % of value + 20 000 $\mu$ V	
Equipment to Measure AC Voltage at the listed frequencies <sup>F</sup>			
1 Hz to 10 Hz	2 000 V	0.014 % of value + 1 200 $\mu$ V	
10 Hz to 40 Hz	2 000 V	0.011 % of value + 400 $\mu$ V	
40 kHz to 10 kHz	2 000 V	0.009 5 % of value + 400 $\mu$ V	
10 kHz to 30kHz	2 000 V	0.02 % of value + 800 $\mu$ V	
30 kHz to 100 kHz	2 000 V	0.051 % of value + 4 000 $\mu$ V	
Equipment to Measure AC Current at the listed frequencies <sup>F</sup>			
1 Hz to 10 Hz	200 $\mu$ A	0.029 % of value + 0.02 $\mu$ A	
10 Hz to 10 kHz	200 $\mu$ A	0.028 % of value + 0.02 $\mu$ A	
10 kHz to 30 kHz	200 $\mu$ A	0.065 % of value + 0.02 $\mu$ A	
30 kHz to 100 kHz	200 $\mu$ A	0.4 % of value + 0.02 $\mu$ A	
Equipment to Measure AC Current at the listed frequencies <sup>F</sup>			
1 Hz to 10 Hz	2 mA	0.029 % of value + 0.2 $\mu$ A	
10 Hz to 10 kHz	2 mA	0.028 % of value + 0.2 $\mu$ A	
10 kHz to 30 kHz	2 mA	0.065 % of value + 0.2 $\mu$ A	
30 kHz to 100 kHz	2 mA	0.4 % of value + 0.2 $\mu$ A	
1 Hz to 10 Hz	20 mA	0.029 % of value + 2 $\mu$ A	
10 Hz to 10 kHz	20 mA	0.028 % of value + 2 $\mu$ A	
10 kHz to 30 kHz	20 mA	0.065 % of value + 2 $\mu$ A	
30 kHz to 100 kHz	20 mA	0.4 % of value + 2 $\mu$ A	





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Equipment to Measure AC Current at the listed frequencies <sup>F</sup>			Fluke 8508A
1 Hz to 10 Hz	200 mA	0.029 % of value + 20 $\mu$ A	
10 Hz to 10 kHz	200 mA	0.028 % of value + 50 $\mu$ A	
10 kHz to 30 kHz	200 mA	0.06 % of value + 20 $\mu$ A	
Equipment to Measure AC Current <sup>F</sup> at the listed frequencies <sup>F</sup>			Fluke 8508A
10 Hz to 2 kHz	2 A	0.06 % of value + 2 $\mu$ A	
2 Hz to 10 kHz	2 A	0.074 % of value + 2 $\mu$ A	
10 kHz to 30 kHz	2 A	0.3 % of value + 2 $\mu$ A	
10 Hz to 2 kHz	20 A	0.08 % of value + 20 $\mu$ A	
2 kHz to 10 kHz	20 A	0.25 % of value + 20 $\mu$ A	
Equipment to Output Resistance <sup>F</sup>			Fluke 8508A
2 $\Omega$		0.001 6 % of value + 0.004 $\mu\Omega$	
20 $\Omega$		0.000 9 % of value + 0.014 $\mu\Omega$	
200 $\Omega$		0.000 75 % of value + 0.05 $\mu\Omega$	
2 k $\Omega$		0.000 76 % of value + 0.000 5 $\Omega$	
20 k $\Omega$		0.000 75 % of value + 0.005 $\Omega$	
200 k $\Omega$		0.000 75 % of value + 0.05 $\Omega$	
2 M $\Omega$		0.000 88 % of value + 0.000 5 k $\Omega$	
20 M $\Omega$		0.001 5 % of value + 0.1 k $\Omega$	
200 M $\Omega$		0.006 % of value + 10 k $\Omega$	
2 G $\Omega$		0.054 % of value + 1 M $\Omega$	
Temperature Calibration Indication and Control Equipment used with Thermocouple Type T <sup>O</sup>			Electrical Simulation of Thermocouple output Greenlee IPM-400, Altek 830 Omega CL-23A, Fluke 724
-250 $^{\circ}$ C to -150 $^{\circ}$ C		0.50 $^{\circ}$ C	
-150 $^{\circ}$ C to 0 $^{\circ}$ C		0.22 $^{\circ}$ C	
0 $^{\circ}$ C to 120 $^{\circ}$ C		0.18 $^{\circ}$ C	
120 $^{\circ}$ C to 400 $^{\circ}$ C		0.17 $^{\circ}$ C	
Temperature Calibration Indication and Control Equipment used with Thermocouple Type J <sup>O</sup>			Electrical Simulation of Thermocouple output Greenlee IPM-400, Altek 830 Omega CL-23A, Fluke 724
-210 $^{\circ}$ C to -100 $^{\circ}$ C		0.26 $^{\circ}$ C	
-100 $^{\circ}$ C to -30 $^{\circ}$ C		0.19 $^{\circ}$ C	
-30 $^{\circ}$ C to 150 $^{\circ}$ C		0.18 $^{\circ}$ C	
150 $^{\circ}$ C to 760 $^{\circ}$ C		0.19 $^{\circ}$ C	
760 $^{\circ}$ C to 1 200 $^{\circ}$ C		0.23 $^{\circ}$ C	



# Certificate of Accreditation: Supplement

## Enviren Calibrations

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### Electrical

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Temperature Calibration Indication and Control Equipment used with Thermocouple Type K <sup>O</sup>	-200 °C to -100 °C	0.31 °C	Electrical Simulation of Thermocouple output Greenlee IPM-400, Altek 830 Omega CL-23A, Fluke 724
	-100 °C to -25 °C	0.21 °C	
	-25 °C to 120 °C	0.20 °C	
	120 °C to 1 000 °C	0.26 °C	
	1 000 °C to 1 372 °C	0.34 °C	
Temperature Indication and Control Equipment used with RTD PT 385 100 $\Omega$ <sup>FO</sup>	-100 °C to 850 °C	0.4 °C	Electrical Simulation of RTD output Greenlee IPM-400, Altek 830, Fluke 724, Fluke 787
Temperature Indication and Control Equipment used with RTD PT 385 1 000 $\Omega$ <sup>FO</sup>	-200 °C to 630 °C	0.4 °C	Fluke 724, Fluke 787
Temperature Indication and Control Equipment responding to voltage <sup>FO</sup>	0 VDC to 10 VDC	0.11 % of value + 0.005 8 V	Electrical Simulation of voltage output Greenlee IPM-400, Altek 830, Fluke 724, Fluke 787
Temperature Indication and Control Equipment responding to current <sup>FO</sup>	4 mA to 20 mA	0.18 % of value + 0.005 8 mA	Electrical Simulation of current output Greenlee IPM-400, Altek 830, Fluke 724, Fluke 787

### Thermodynamic

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Equipment to Measure Humidity <sup>FO</sup> Fixed points	11.3 % RH	1.4 % RH	Vaisala HMK-15 with: LiCl NaCl, K2SO4
	75.5 % RH	1.6 % RH	
	97.6 % RH	2.1 % RH	
Equipment to Measure Humidity <sup>FO</sup>	10 % RH to 90 % RH	1.8 % RH	Vaisala HMI41 with HMP-46 humidity Probe
	90 % RH to 95 % RH	2.9 % RH	





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### Enviren Calibrations

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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 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<sup>F</sup> would mean that the laboratory performs this calibration at its fixed location.
4. The presence of a superscript O means that the laboratory performs calibration of the indicated parameter onsite at customer locations. Example: Outside Micrometer<sup>O</sup> would mean that the laboratory performs this calibration onsite at the customer's location.
5. 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<sup>FO</sup> would mean that the laboratory performs this calibration at its fixed location and onsite at customer locations.
6. 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.