



PERRY JOHNSON LABORATORY ACCREDITATION, INC.

Certificate of Accreditation

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

***East Tennessee Calibration Laboratory
705 South Roane Street, Suite Two
Harriman, TN 37748***

(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 Dimensional, Force, Mass, Thermodynamic, Electrical,
Torque, Time, Frequency and Pressure
(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 Szeszen
President/Operations Manager

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

Initial Accreditation Date:
June 30, 2005

Accreditation No.:
59332

Issue Date:
November 23, 2009

Certificate No.:
L09-114

Expiration Date:
November 22, 2011

Page No.:
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Certificate of Accreditation: Supplement

East Tennessee Calibration Laboratory
 705 South Roane Street, Suite Two
 Harriman, TN 37748

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

Dimensional

MEASURED INSTRUMENT, QUANTITY OR GAUGE	RANGE (AND SPECIFICATION WHERE APPROPRIATE)	BEST MEASUREMENT CAPABILITY EXPRESSED AS AN UNCERTAINTY (\pm)	REMARKS
Ring Gages (Plain)	0.0 mm to 203.2 mm	0.000 89 mm	Gage Blocks
Indicators (Dial/Digital)	0.0 mm to 304.8 mm	0.002 mm	
Height Gages	0.0 mm to 609.6 mm	0.013 mm	
	609.6 mm to 1 524.0 mm	0.02 mm	
Steel Rules	0 mm to 609.6 mm	0.16 mm	
	609.6 mm to 1 524.0 mm	0.23 mm	
Squares	0 mm to 609.6 mm	0.000 59 mm	
	609.6 mm to 1 219.2 mm	0.001 3 mm	
Straight Edges	0 mm to 609.6 mm	0.000 61 mm	
	609.6 mm to 1 219.2 mm	0.001 3 mm	
Parallels	0 mm to 609.6 mm	0.001 8 mm	
	609.6 mm to 1 219.2 mm	0.002 8 mm	
Right Angles, Universal	0 mm to 609.6 mm	0.001 4 mm	
	609.6 mm to 1 219.2 mm	0.002 5 mm	
Gage Blocks	0.254 mm to 25.4 mm	0.000 13 mm	Gage Block Comparator Master Blocks
	25.4 mm to 101.6 mm	0.000 16 mm	
	101.6 mm to 203.2 mm	0.000 34 mm	
Protractors	0° to 90°	0.1°	Angle Blocks
Angle Blocks	0° to 45°	0.02°	Comparator
Bore Gages (2 point)	19 mm to 254 mm	0.051 mm	Gage Blocks
Radius Gages	0.4 mm to 304.8 mm	0.051 mm	
Measuring Tapes	0 mm to 609.6 mm	0.23 mm	
	609.6 mm to 1 524.0 mm	2.3 mm	
Pi Tapes	609.6 mm to 1 524.0 mm	0.051 mm	
3-D Point Coordinates	X Axis to 1 219.2 mm	0.002 9 mm	
	Y Axis to 2 032 mm	0.002 9 mm	
	Z Axis to 1 016 mm	0.002 9 mm	



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Mass, Force, and Weighing Devices

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Analytical Balances	50 mg to 30 g	0.2 mg	Class 1 Weights
	30 g to 60 g	0.4 mg	
	60 g to 120 g	0.6 mg	
	120 g to 150 g	0.76 mg	
	150 g to 210 g	0.8 mg	
Electronic Balances	210 g to 240 g	0.81 mg	
	240 g to 270 g	0.84 mg	
	270 g to 300 g	0.89 mg	
	300 g to 800 g	7.0 mg	
	800 g to 1.4 kg	7.2 mg	
	1.4 kg to 1.8 kg	7.5 mg	
	1.8 kg to 2.0 kg	7.7 mg	
	2.0 kg to 2.4 kg	15 mg	
2.4 kg to 3.0 kg	16 mg		
Scales	1 kg to 5 kg	50 mg	
	5 kg to 10 kg	100 mg	
	10 kg to 453.529 37 kg	0.050 kg	
Test Load Cell	0.01 kip to 1 kip	0.01 kip	Class F Weights Standard Load Cell
	10 kip to 100 kip	0.1 kip	
	100 kip to 500 kip	1.0 kip	
Compression Machine	1 N to 13 344.69 N	45 N	Standard Load Cell
	13 344.69 N to 1 112 055.38 N	4 500 N	
	1 112 055.38 N to 2 224 110.86 N	9 000 N	



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Electrical

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Temperature Calibration, Indication and Control Equipment used with Thermocouple Type B Source and Measure	600 °C to 800 °C	0.44 °C	Electrical Simulation of Thermocouple Output Fluke 5500A
	800 °C to 1 000 °C	0.34 °C	
	1 000 °C to 1 550 °C	0.30 °C	
	1 550 °C to 1 820 °C	0.33 °C	
Temperature Calibration, Indication and Control Equipment used with Thermocouple Type C Source and Measure	0 °C to 150 °C	0.30 °C	
	150 °C to 650 °C	0.26 °C	
	650 °C to 1 000 °C	0.31 °C	
	1 000 °C to 1 800 °C	0.50 °C	
Temperature Calibration, Indication and Control Equipment used with Thermocouple Type E Source and Measure	1 800 °C to 2 316 °C	0.84 °C	
	-196 °C to -100 °C	0.50 °C	
	-100 °C to 25 °C	0.16 °C	
	25 °C to 350 °C	0.14 °C	
Temperature Calibration, Indication and Control Equipment used with Thermocouple Type J Source and Measure	350 °C to 650 °C	0.16 °C	
	650 °C to 1 000 °C	0.21 °C	
	-196 °C to -100 °C	0.27 °C	
	-100 °C to -30 °C	0.16 °C	
Temperature Calibration, Indication and Control Equipment used with Thermocouple Type K Source and Measure	-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	
	-196 °C to -100 °C	0.33 °C	
Temperature Calibration, Indication and Control Equipment used with Thermocouple Type L Source and Measure	-100 °C to 25 °C	0.18 °C	
	25 °C to 120 °C	0.16 °C	
	120 °C to 1 000 °C	0.26 °C	
	1 000 °C to 1 372 °C	0.40 °C	
Temperature Calibration, Indication and Control Equipment used with Thermocouple Type N Source and Measure	-196 °C to -100 °C	0.37 °C	
	-100 °C to 800 °C	0.26 °C	
	800 °C to 900 °C	0.17 °C	
Temperature Calibration, Indication and Control Equipment used with Thermocouple Type N Source and Measure	-196 °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 1 300 °C	0.27 °C	



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Temperature Calibration, Indication and Control Equipment used with Thermocouple Type R Source and Measure	0 °C to 250 °C	0.57 °C	Electrical Simulation of Thermocouple Output Fluke 5500A
	250 °C to 400 °C	0.37 °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 Source and Measure	0 °C to 250 °C	0.47 °C	
	250 °C to 400 °C	0.36 °C	
	400 °C to 1 000 °C	0.37 °C	
	1 000 °C to 1 767 °C	0.46 °C	
Temperature Calibration, Indication and Control Equipment used with Thermocouple Type T Source and Measure	-196 °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 Source and Measure	-196 °C to 0 °C	0.56 °C	
	0 °C to 600 °C	0.27 °C	
RTD (Pt 385) 100 Ω Source and Measure	-196 °C to -80 °C	0.05 °C	Fluke 5500A
	-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	0.14 °C	
RTD (Pt 3916) 100 Ω Source and Measure	-196 °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	
	600 °C to 630 °C	0.23 °C	



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RTD (Pt 385) 200 Ω Source and Measure	-196 $^{\circ}\text{C}$ to -80 $^{\circ}\text{C}$	0.04 $^{\circ}\text{C}$	Fluke 5500A
	-80 $^{\circ}\text{C}$ to 0 $^{\circ}\text{C}$	0.04 $^{\circ}\text{C}$	
	0 $^{\circ}\text{C}$ to 100 $^{\circ}\text{C}$	0.04 $^{\circ}\text{C}$	
	100 $^{\circ}\text{C}$ to 260 $^{\circ}\text{C}$	0.05 $^{\circ}\text{C}$	
	260 $^{\circ}\text{C}$ to 300 $^{\circ}\text{C}$	0.12 $^{\circ}\text{C}$	
	300 $^{\circ}\text{C}$ to 400 $^{\circ}\text{C}$	0.13 $^{\circ}\text{C}$	
	400 $^{\circ}\text{C}$ to 600 $^{\circ}\text{C}$	0.14 $^{\circ}\text{C}$	
	600 $^{\circ}\text{C}$ to 630 $^{\circ}\text{C}$	0.16 $^{\circ}\text{C}$	
RTD (Pt 385) 500 Ω Source and Measure	-196 $^{\circ}\text{C}$ to -80 $^{\circ}\text{C}$	0.04 $^{\circ}\text{C}$	Fluke 5500A
	-80 $^{\circ}\text{C}$ to 0 $^{\circ}\text{C}$	0.05 $^{\circ}\text{C}$	
	0 $^{\circ}\text{C}$ to 100 $^{\circ}\text{C}$	0.05 $^{\circ}\text{C}$	
	100 $^{\circ}\text{C}$ to 260 $^{\circ}\text{C}$	0.06 $^{\circ}\text{C}$	
	260 $^{\circ}\text{C}$ to 300 $^{\circ}\text{C}$	0.08 $^{\circ}\text{C}$	
	300 $^{\circ}\text{C}$ to 400 $^{\circ}\text{C}$	0.08 $^{\circ}\text{C}$	
	400 $^{\circ}\text{C}$ to 600 $^{\circ}\text{C}$	0.09 $^{\circ}\text{C}$	
	600 $^{\circ}\text{C}$ to 630 $^{\circ}\text{C}$	0.11 $^{\circ}\text{C}$	
RTD (Pt 385) 1 000 Ω Source and Measure	-190 $^{\circ}\text{C}$ to -80 $^{\circ}\text{C}$	0.03 $^{\circ}\text{C}$	Fluke 5500A
	-80 $^{\circ}\text{C}$ to 0 $^{\circ}\text{C}$	0.03 $^{\circ}\text{C}$	
	0 $^{\circ}\text{C}$ to 100 $^{\circ}\text{C}$	0.04 $^{\circ}\text{C}$	
	100 $^{\circ}\text{C}$ to 260 $^{\circ}\text{C}$	0.05 $^{\circ}\text{C}$	
	260 $^{\circ}\text{C}$ to 300 $^{\circ}\text{C}$	0.06 $^{\circ}\text{C}$	
	300 $^{\circ}\text{C}$ to 400 $^{\circ}\text{C}$	0.07 $^{\circ}\text{C}$	
	400 $^{\circ}\text{C}$ to 600 $^{\circ}\text{C}$	0.07 $^{\circ}\text{C}$	
	600 $^{\circ}\text{C}$ to 630 $^{\circ}\text{C}$	0.23 $^{\circ}\text{C}$	
RTD (Ni 385) 120 Ω Source and Measure	-80 $^{\circ}\text{C}$ to 0 $^{\circ}\text{C}$	0.08 $^{\circ}\text{C}$	Fluke 5500A
	0 $^{\circ}\text{C}$ to 100 $^{\circ}\text{C}$	0.08 $^{\circ}\text{C}$	
	100 $^{\circ}\text{C}$ to 260 $^{\circ}\text{C}$	0.14 $^{\circ}\text{C}$	
RTD (Cu 427) 10 Ω	-100 $^{\circ}\text{C}$ to 260 $^{\circ}\text{C}$	0.30 $^{\circ}\text{C}$	Fluke 5500A



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DC Voltage-Source	0 mV to 330 mV	0.006 % of reading + 3 μV	Fluke 5500A
	330 mV to 3.3 V	0.005 % of reading + 5 μV	
	3.3 V to 33 V	0.005 % of reading + 50 μV	
	33 V to 330 V	0.005 5 % of reading + 500 μV	
	330 V to 1 000 V	0.005 5 % of reading + 1 500 μV	
DC Current-Source	0 mA to 3.3 mA	0.013 % of reading + 0.05 μA	
	3.3 mA to 33 mA	0.01 % of reading + 0.25 μA	
	33 mA to 330 mA	0.01 % of reading + 3.3 μA	
	330 mA to 2.2 A	0.03 % of reading + 44 μA	
	2.2 A to 11 A	0.06 % of reading + 330 μA	
Resistance-Source	0 Ω to 11 Ω	0.012 % of reading + 0.008 Ω	
	11 Ω to 33 Ω	0.012 % of reading + 0.015 Ω	
	33 Ω to 110 Ω	0.009 % of reading + 0.015 Ω	
	110 Ω to 330 Ω	0.009 % of reading + 0.015 Ω	
	330 Ω to 1.1 kΩ	0.009 % of reading + 0.06 Ω	
	1.1 kΩ to 3.3 kΩ	0.009 % of reading + 0.06 Ω	
	3.3 kΩ to 11 kΩ	0.009 % of reading + 0.6 Ω	
	11 kΩ to 33 kΩ	0.009 % of reading + 0.6 Ω	
	33 kΩ to 110 kΩ	0.011 % of reading + 6 Ω	
	110 kΩ to 330 kΩ	0.012 % of reading + 6 Ω	
	330 kΩ to 1.1 MΩ	0.015 % of reading + 55 Ω	
	1.1 MΩ to 3.3 MΩ	0.015 % of reading + 55 Ω	
	3.3 MΩ to 11 MΩ	0.06 % of reading + 550 Ω	
	11 MΩ to 33 MΩ	0.1 % of reading + 550 Ω	
	33 MΩ to 110 MΩ	0.5 % of reading + 5 500 Ω	
110 MΩ to 330 MΩ	0.5 % of reading + 16 500 Ω		



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AC Voltage – Generate At the listed frequencies			Fluke 5500A
10 Hz to 45 Hz	1 mV to 33 mV	0.35 % of reading + 20 μ V	
45 Hz to 10 kHz	1 mV to 33 mV	0.15 % of reading + 20 μ V	
10 kHz to 20 kHz	1 mV to 33 mV	0.20 % of reading + 20 μ V	
20 kHz to 50 kHz	1 mV to 33 mV	0.25 % of reading + 20 μ V	
50 kHz to 100 kHz	1 mV to 33 mV	0.35 % of reading + 33 μ V	
100 kHz to 500 kHz	1 mV to 33 mV	1 % of reading + 60 μ V	
AC Voltage – Generate At the listed frequencies			
10 Hz to 45 Hz	33 mV to 330 mV	0.25 % of reading + 50 μ V	
45 Hz to 10 kHz	33 mV to 330 mV	0.05 % of reading + 20 μ V	
10 kHz to 20 kHz	33 mV to 330 mV	0.1 % of reading + 20 μ V	
20 kHz to 50 kHz	33 mV to 330 mV	0.16 % of reading + 40 μ V	
50 kHz to 100 kHz	33 mV to 330 mV	0.24 % of reading + 170 μ V	
100 kHz to 500 kHz	33 mV to 330 mV	0.7 % of reading + 330 μ V	
AC Voltage – Generate At the listed frequencies			
10 Hz to 45 Hz	0.33 V to 3.3 V	0.15 % of reading + 250 μ V	
45 Hz to 10 kHz	0.33 V to 3.3 V	0.03 % of reading + 60 μ V	
10 kHz to 20 kHz	0.33 V to 3.3 V	0.08 % of reading + 60 μ V	
20 kHz to 50 kHz	0.33 V to 3.3 V	0.14 % of reading + 330 μ V	
50 kHz to 100 kHz	0.33 V to 3.3 V	0.24 % of reading + 1 700 μ V	
100 kHz to 500 kHz	0.33 V to 3.3 V	0.5 % reading + 3 300 μ V	
AC Voltage – Generate At the listed frequencies			
10 Hz to 45 Hz	3.3 V to 33 V	0.15 % of reading + 2 500 μ V	
45 Hz to 10 kHz	3.3 V to 33 V	0.04 % of reading + 600 μ V	
10 kHz to 20 kHz	3.3 V to 33 V	0.08 % of reading + 2 600 μ V	
20 kHz to 50 kHz	3.3 V to 33 V	0.19 % of reading + 5 000 μ V	
50 kHz to 100 kHz	3.3 V to 33 V	0.24 % of reading + 17 000 μ V	



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AC Voltage – Generate At the listed frequencies			Fluke 5500A
45 Hz to 1 kHz	33 V to 330 V	0.05 % of reading + 6.6 mV	
1 kHz to 10 kHz	33 V to 330 V	0.08 % of reading + 15 mV	
10 kHz to 20 kHz	33 V to 330 V	0.09 % of reading + 33 mV	
AC Voltage – Generate At the listed frequencies			
45 Hz to 1 kHz	330 V to 1 000 V	0.05 % of reading + 80 mV	
1 kHz to 5 kHz	330 V to 1 000 V	0.20 % of reading + 100 mV	
5 kHz to 10 kHz	330 V to 1 000 V	0.20 % of reading + 500 mV	
AC Current – Source At the listed frequencies			
10 Hz to 20 Hz	29 μ A to 330 μ A	0.2 % of reading + 0.3 μ A	
20 Hz to 45 Hz	29 μ A to 330 μ A	0.1 % of reading + 0.3 μ A	
45 Hz to 1 kHz	29 μ A to 330 μ A	0.1 % of reading + 0.3 μ A	
1 kHz to 5 kHz	29 μ A to 330 μ A	0.2 % of reading + 0.3 μ A	
5 kHz to 10 kHz	29 μ A to 330 μ A	0.6 % of reading + 0.3 μ A	
AC Current – Source At the listed frequencies			
10 Hz to 20 Hz	0.33 mA to 3.3 mA	0.25 % of reading + 0.15 μ A	
20 Hz to 45 Hz	0.33 mA to 3.3 mA	0.13 % of reading + 0.15 μ A	
45 Hz to 1 kHz	0.33 mA to 3.3 mA	0.13 % of reading + 0.15 μ A	
1 kHz to 5 kHz	0.33 mA to 3.3 mA	0.4 % of reading + 0.15 μ A	
5 kHz to 10 kHz	0.33 mA to 3.3 mA	1.25 % of reading + 0.15 μ A	
AC Current – Source At the listed frequencies			
10 Hz to 20 Hz	3.3 mA to 33 mA	0.2 % of reading + 3 μ A	
20 Hz to 45 Hz	3.3 mA to 33 mA	0.1 % of reading + 3 μ A	
45 Hz to 1 kHz	3.3 mA to 33 mA	0.09 % of reading + 3 μ A	
1 kHz to 5 kHz	3.3 mA to 33 mA	0.2 % of reading + 3 μ A	
5 kHz to 10 kHz	3.3 mA to 33 mA	0.6 % of reading + 3 μ A	



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AC Current – Source At the listed frequencies			Fluke 5500A
10 Hz to 20 Hz	33 mA to 330 mA	0.2 % of reading + 30 μ A	
20 Hz to 45 Hz	33 mA to 330 mA	0.1 % of reading + 30 μ A	
45 Hz to 1 kHz	33 mA to 330 mA	0.09 % of reading + 30 μ A	
1 kHz to 5 kHz	33 mA to 330 mA	0.2 % of reading + 30 μ A	
5 kHz to 10 kHz	33 mA to 330 mA	0.6 % of reading + 30 μ A	
AC Current – Source At the listed frequencies			
10 Hz to 45 Hz	0.33 A to 2.2 A	0.2 % of reading + 300 μ A	
45 Hz to 1 kHz	0.33 A to 2.2 A	0.1 % of reading + 300 μ A	
1 kHz to 5 kHz	0.33 A to 2.2 A	0.75 % of reading + 300 μ A	
AC Current – Source At the listed frequencies			
45 Hz to 65 Hz	2.2 A to 11 A	0.06 % of reading + 2 000 μ A	
65 Hz to 500 Hz	2.2 A to 11 A	0.1 % of reading + 2 000 μ A	
500 Hz to 1 kHz	2.2 A to 11 A	0.33 % of reading + 2 000 μ A	
AC Current – Source At the listed frequencies			
45 Hz to 65 Hz	11 A to 110 A	0.6 % of reading + 0.5 A	
AC Current – Source At the listed frequencies			
45 Hz to 65 Hz	110 A to 550 A	0.6 % of reading + 0.7 A	
Capacitance – Source At the listed frequencies			
0.19 nF to 0.4 nF	50 Hz to 1 000 Hz	0.5 % of reading + 0.01 nF	
0.4 nF to 1.1 nF	50 Hz to 1 000 Hz	0.5 % of reading + 0.01 nF	
1.1 nF to 3.3 nF	50 Hz to 1 000 Hz	0.5 % of reading + 0.01 nF	
3.3 nF to 11 nF	50 Hz to 1 000 Hz	0.5 % of reading + 0.01 nF	
11 nF to 33 nF	50 Hz to 1 000 Hz	0.25 % of reading + 0.1 nF	
33 nF to 110 nF	50 Hz to 1 000 Hz	0.25 % of reading + 0.1 nF	
110 nF to 330 nF	50 Hz to 1 000 Hz	0.25 % of reading + 0.3 nF	
0.33 μ F to 1.1 μ F	50 Hz to 1 000 Hz	0.25 % of reading + 1 nF	
1.1 μ F to 3.3 μ F	50 Hz to 1 000 Hz	0.35 % of reading + 3 nF	



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Capacitance – Source At the listed frequencies			Fluke 5500A
3.3 μ F to 11 μ F	50 Hz to 400 Hz	0.35 % of reading + 10 nF	
11 μ F to 33 μ F	50 Hz to 400 Hz	0.4 % of reading + 30 nF	
33 μ F to 110 μ F	50 Hz to 200 Hz	0.5 % of reading + 100 nF	
110 μ F to 330 μ F	50 Hz to 100 Hz	0.7 % of reading + 300 nF	
0.33 mF to 1.1 mF	50 Hz to 100 Hz	1 % reading + 300 nF	
Phase Angle – Source At the listed frequencies			
10 Hz to 65 Hz	0° to 180°	0.15°	
65 Hz to 500 Hz	0° to 180°	0.9°	
500 Hz to 1 kHz	0° to 180°	2.0°	
1 kHz to 5 kHz	0° to 180°	6.0°	
5 kHz to 10 kHz	0° to 180°	10.0°	
DC Power – Source At the listed frequencies			
3.3 mA to 9 mA	33 mV to 1 020 V	0.04 % of reading	
9 mA to 33 mA	33 mV to 1 020 V	0.03 % of reading	
33 mA to 90 mA	33 mV to 1 020 V	0.04 % of reading	
90 mA to 330 mA	33 mV to 1 020 V	0.03 % of reading	
0.33 A to 0.9 A	33 mV to 1 020 V	0.08 % of reading	
0.9 A to 2.2 A	33 mV to 1 020 V	0.06 % of reading	
2.2 A to 4.5 A	33 mV to 1 020 V	0.12 % of reading	
4.5 A to 11 A	33 mV to 1 020 V	0.09 % of reading	



Certificate of Accreditation: Supplement

East Tennessee Calibration Laboratory
705 South Roane Street, Suite Two
Harriman, TN 37748

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-Measure	0 mV to 100 mV	0.005 % of reading + 0.003 5 % of range	Solartron 7061
	0.1 V to 1 V	0.004 % of reading + 0.007 % of range	
	1 V to 10 V	0.003 5 % of reading + 0.000 5 % of range	
	10 V to 100 V	0.004 5 % of reading + 0.000 6 % of range	
	100 V to 1 000 V	0.004 5 % of reading + 0.001 0 % of range	
DC Voltage-Measure	1 kV to 5 kV	1.05 % of reading + 1 digit	
DC Current-Measure	0 mA to 10 mA	0.050 % of reading + 0.020 % of range	
	10 mA to 100 mA	0.050 % of reading + 0.005 % of range	
	0.1 A to 1 A	0.100 % of reading + 0.010 % of range	
	1 A to 3 A	0.120 % of reading + 0.020 % of range	
DC Current-Measure	3 A to 10 A	0.2 % of reading + 2 digit	
Resistance-Measure	0 Ω to 100 Ω	0.010 % of reading + 0.004 % of range	
	0.1 k Ω to 1 k Ω	0.010 % of reading + 0.001 % of range	
	1 k Ω to 10 k Ω	0.010 % of reading + 0.001 % of range	
	10 k Ω to 100 k Ω	0.010 % of reading + 0.001 % of range	
	100 k Ω to 1 M Ω	0.010 % of reading + 0.001 % of range	
	1 M Ω to 10 M Ω	0.040 % of reading + 0.001 % of range	
	10 M Ω to 100 M Ω	0.800 % of reading + 0.010 % of range	



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AC Voltage - Measure At the listed frequencies			Solartron 7061
3 Hz to 5 Hz	0 mV to 100 mV	1.00 % of reading + 0.04 % of range	
5 Hz to 10 Hz	0 mV to 100 mV	0.35 % of reading + 0.04 % of range	
10 kHz to 20 kHz	0 mV to 100 mV	0.06 % of reading + 0.04 % of range	
20 kHz to 50 kHz	0 mV to 100 mV	0.12 % of reading + 0.05 % of range	
50 kHz to 100 kHz	0 mV to 100 mV	0.60 % of reading + 0.08 % of range	
100 kHz to 300 kHz	0 mV to 100 mV	4.00 % of reading + 0.50 % of range	
AC Voltage - Measure At the listed frequencies			
3 Hz to 5 Hz	100 mV to 750 mV	1.00 % of reading + 0.03 % of range	
5 Hz to 10 Hz	100 mV to 750 mV	0.35 % of reading + 0.03 % of range	
10 kHz to 20 kHz	100 mV to 750 mV	0.06 % of reading + 0.03 % of range	
20 kHz to 50 kHz	100 mV to 750 mV	0.12 % of reading + 0.05 % of range	
50 kHz to 100 kHz	100 mV to 750 mV	0.60 % of reading + 0.08 % of range	
100 kHz to 300 kHz	100 mV to 750 mV	4.00 % of reading + 0.50 % of range	
AC Voltage - Measure At the listed frequencies			
50 Hz to 100 Hz	750 V to 1000 V	0.7 % of reading + 2 digit	
AC Current - Measure At the listed frequencies			
3 Hz to 5 Hz	0 A to 1 A	1.00 % of reading + 0.04 % of range	
5 Hz to 10 Hz	0 A to 1 A	0.30 % of reading + 0.04 % of range	
10 Hz to 5 kHz	0 A to 1 A	0.10 % of reading + 0.04 % of range	
AC Current - Measure At the listed frequencies			
3 Hz to 5 Hz	1 A to 3 A	1.10 % of reading + 0.06 % of range	
5 Hz to 10 Hz	1 A to 3 A	0.35 % of reading + 0.06 % of range	
10 Hz to 5 kHz	1 A to 3 A	0.15 % of reading + 0.06 % of range	
AC Current - Measure At the listed frequencies			
50 Hz to 10 kHz	3 A to 10 A	1.0 % of reading + 2 digit	



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pH meter	4 pH to 10 pH	0.01 pH	Electrical Simulation of pH Fluke 5500A

Mechanical

MEASURED INSTRUMENT, QUANTITY OR GAUGE	RANGE (AND SPECIFICATION WHERE APPROPRIATE)	BEST MEASUREMENT CAPABILITY EXPRESSED AS AN UNCERTAINTY (\pm)	REMARKS
Pressure	0 kgf/cm ² to 703.069 kgf/cm ²	0.01 % of reading	Fluke 725
Pressure (Pneumatic)	0.281 kgf/cm ² to 2.180 kgf/cm ²	0.025 % of reading	
Vacuum	2.540 cmHg	0.050 % of reading	

Thermodynamic

MEASURED INSTRUMENT, QUANTITY OR GAUGE	RANGE (AND SPECIFICATION WHERE APPROPRIATE)	BEST MEASUREMENT CAPABILITY EXPRESSED AS AN UNCERTAINTY (\pm)	REMARKS
Temperature Source and Measure	100 °C to 1 000 °C	0.5 °C	Temperature Bath and Dry Block
	1 000 °C to 2 000 °C	2.0 °C	

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.