



PERRY JOHNSON LABORATORY ACCREDITATION, INC.

Certificate of Accreditation

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

Accuserve, Inc.

16415 Northcross Drive, Suite A, Huntersville, NC 28078

(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/NCSI Z540.1-1994
& ANSI/NCSI Z540.3-2006 sub-clause 5.3**

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 April 2017):

***Electrical, Dimensional, Frequency, Humidity,
Mass, Pressure, Sound, Temperature, Time,
Test Instruments, Torque Instruments, and Vacuum 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

Initial Accreditation Date:

April 3, 2001

Issue Date:

June 18, 2017

Expiration Date:

August 31, 2019

Revision Date:

November 1, 2018

Accreditation No.:

56060

Certificate No.:

L17-270-R1

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



Certificate of Accreditation: Supplement

Accuserve, Inc.

16415 Northcross Drive, Suite A, Huntersville, NC 28078
 Contact Name: Michael Griffith Phone: (704) 535-0100

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

Acoustical

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
Sound Level Meter ^{FO}	94 dB	0.38 dB	Bruel & Kjaer 4231
	114 dB	0.38 dB	

Dimensional

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
Micrometers ^{FO} (50 μ m resolution)	1.27 mm to 101.6 mm (0.05 in to 4 in)	(1.47 + 0.001L) μ m [(58 + 1L) μ m]	Gage Blocks
Micrometers ^{FO} (0.000 1 in resolution)	101.6 mm to 254 mm (4 in to 10 in)	(2.85 + 0.001L) μ m [(112 + 1L) μ m]	
		254 mm to 304.8 mm (10 in to 12 in)	(5.87 + 0L) μ m [(231 + 0L) μ m]
Calipers ^{FO} (0.000 5 in resolution)	1.27 mm to 254 mm (0.05 in to 10 in)	(14.66 + 0.001L) μ m [(577 + 1L) μ m]	Gage Blocks
Indicators ^{FO} (50 μ m resolution)	2.5 μ m to 38.1 mm (0.000 1 in to 1.5 in)	(1.47 + 0.001L) μ m [(58 + 1L) μ m]	
Height Gages ^{FO} (0.000 1 in resolution)	1.27 mm to 609.6 mm (0.05 in to 24 in)	(2.9 + 0.009L) μ m [(115 + 9L) μ m]	Mitutoyo 515-565, Starrett 234A
Calipers ^{FO} (0.001 in resolution)	1.27 mm to 609.6 mm (0.05 in to 24 in)	(29.31 + 0.002L) μ m [(1 154 + 2L) μ m]	

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 Output DC Voltage ^{FO}	2.4 mV to 100 mV	1 μ V + 0.000 7 % of Reading	Hewlett Packard 3458A Opt 002
	100 mV to 1 V	1 μ V + 0.000 6 % of Reading	
	1 V to 10 V	2 μ V + 0.000 6 % of Reading	
	10 V to 100 V	32 μ V + 0.000 8 % of Reading	
	100 V to 1 000 V	10.1 mV + 0.000 8 % of Reading	
Equipment to Measure DC Voltage ^{FO}	72 μ V to 330 mV	4.3 μ V + 0.006 % of Reading	Fluke 5500A
	330 mV to 3.3 V	18 μ V + 0.005 % of Reading	
	3.3 V to 33 V	200 μ V + 0.005 % of Reading	
	30 V to 330 V	2 mV + 0.005 5 % of Reading	
	100 V to 1 020 V	1.5 mV + 0.005 5 % of Reading	



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Equipment to Output AC Voltage At the Listed Frequencies ^{FO}			Hewlett Packard 3458A Opt 002
1 Hz to 40 Hz	18 μ V to 10 mV	3 μ V + 0.03 % of Reading	
40 Hz to 1 kHz	9.3 μ V to 10 mV	1.1 μ V + 0.02 % of Reading	
1 kHz to 20 kHz	12.3 μ V to 10 mV	1.1 μ V + 0.03 % of Reading	
20 kHz to 50 kHz	33.3 μ V to 10 mV	1.1 μ V + 0.1 % of Reading	
50 kHz to 100 kHz	153.3 μ V to 10 mV	1.1 μ V + 0.5 % of Reading	
100 kHz to 300 kHz	1.2 mV to 10 mV	2 μ V + 4 % of Reading	
Equipment to Output AC Voltage At the Listed Frequencies ^{FO}			Hewlett Packard 3458A Opt 002
1 Hz to 40 Hz	10 mV to 100 mV	4 μ V + 0.007 % of Reading	
40 Hz to 1 kHz		2 μ V + 0.007 % of Reading	
1 kHz to 20 kHz		2 μ V + 0.014 % of Reading	
20 kHz to 50 kHz		2 μ V + 0.03 % of Reading	
50 kHz to 100 kHz		2 μ V + 0.08 % of Reading	
Equipment to Output AC Voltage At the Listed Frequencies ^{FO}			Hewlett Packard 3458A Opt 002
100 kHz to 300 kHz	10 mV to 100 mV	10 μ V + 0.3 % of Reading	
300 kHz to 1 MHz		10 μ V + 1 % of Reading	
1 MHz to 2 MHz		10 μ V + 1.5 % of Reading	
Equipment to Output AC Voltage At the Listed Frequencies ^{FO}			Hewlett Packard 3458A Opt 002
1 Hz to 40 Hz	100 mV to 1 V	40 μ V + 0.007 % of Reading	
40 Hz to 1 kHz		20 μ V + 0.007 % of Reading	
1 kHz to 20 kHz		20 μ V + 0.014 % of Reading	
20 kHz to 50 kHz		20 μ V + 0.03 % of Reading	
50 kHz to 100 kHz		20 μ V + 0.08 % of Reading	
100 kHz to 300 kHz		100 μ V + 0.3 % of Reading	
300 kHz to 1 MHz		100 μ V + 1 % of Reading	
1 MHz to 2 MHz		100 μ V + 1.5 % of Reading	



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Equipment to Output AC Voltage At the Listed Frequencies ^{FO}			Hewlett Packard 3458A Opt 002
1 Hz to 40 Hz	1 V to 10 V	400 μ V + 0.007 % of Reading	
40 Hz to 1 kHz		200 μ V + 0.007 % of Reading	
1 kHz to 20 kHz		200 μ V + 0.014 % of Reading	
20 kHz to 50 kHz		200 μ V + 0.03 % of Reading	
50 kHz to 100 kHz		200 μ V + 0.08 % of Reading	
100 kHz to 300 kHz		1 mV + 0.3 % of Reading	
300 kHz to 1 MHz		1 mV + 1 % of Reading	
1 MHz to 2 MHz		1 mV + 1.5 % of Reading	
Equipment to Output AC Voltage At the Listed Frequencies ^{FO}			
1 Hz to 40 Hz	10 V to 100 V	4 mV + 0.02 % of Reading	
40 Hz to 1 kHz		2 mV + 0.02 % of Reading	
1 kHz to 20 kHz		2 mV + 0.02 % of Reading	
20 kHz to 50 kHz		2 mV + 0.035 % of Reading	
50 kHz to 100 kHz		2 mV + 0.12 % of Reading	
100 kHz to 300 kHz		10 mV + 0.4 % of Reading	
300 kHz to 1 MHz		10 mV + 1.5 % of Reading	
Equipment to Output AC Voltage At the Listed Frequencies ^{FO}			
1 Hz to 40 Hz	100 V to 1 000 V	40 mV + 0.04 % of Reading	
40 Hz to 1 kHz		20 mV + 0.04 % of Reading	
1 kHz to 20 kHz		20 mV + 0.06 % of Reading	
20 kHz to 50 kHz		20 mV + 0.12 % of Reading	
50 kHz to 100 kHz		20 mV + 0.3 % of Reading	



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Equipment to Measure AC Voltage At the Listed Frequencies ^{FO}			Fluke 5500A
10 Hz to 45 Hz	1 mV to 33 mV	22.6 μ V + 0.35 % of Reading	
45 Hz to 10 kHz		22.7 μ V + 0.15 % of Reading	
10 kHz to 20 kHz		22.7 μ V + 0.2 % of Reading	
20 kHz to 50 kHz		23.4 μ V + 0.25 % of Reading	
50 kHz to 100 kHz		39.5 μ V + 0.35 % of Reading	
100 kHz to 500 kHz		170 μ V + 1 % of Reading	
Equipment to Measure AC Voltage At the Listed Frequencies ^{FO}			Fluke 5500A
10 Hz to 45 Hz	33 mV to 330 mV	73 μ V + 0.25 % of Reading	
45 Hz to 10 kHz		43 μ V + 0.05 % of Reading	
10 kHz to 20 kHz		44 μ V + 0.1 % of Reading	
20 kHz to 50 kHz		71 μ V + 0.16 % of Reading	
50 kHz to 100 kHz		229 μ V + 0.24 % of Reading	
100 kHz to 500 kHz		1.33 mV + 0.7 % of Reading	
Equipment to Measure AC Voltage At the Listed Frequencies ^{FO}			Fluke 5500A
10 Hz to 45 Hz	0.33 V to 3.3 V	480 μ V + 0.15 % of Reading	
45 Hz to 10 kHz		290 μ V + 0.03 % of Reading	
10 kHz to 20 kHz		290 μ V + 0.08 % of Reading	
20 kHz to 50 kHz		610 μ V + 0.14 % of Reading	
50 kHz to 100 kHz		2.3 mV + 0.24 % of Reading	
100 kHz to 500 kHz		13.3 mV + 0.5 % of Reading	
Equipment to Measure AC Voltage At the Listed Frequencies ^{FO}			
10 Hz to 45 Hz	3.3 V to 33 V	7 mV + 0.15 % of Reading	
45 Hz to 10 kHz		3.6 mV + 0.04 % of Reading	
10 kHz to 20 kHz		5.6 mV + 0.08 % of Reading	
20 kHz to 50 kHz		9.2 mV + 0.19 % of Reading	
50 kHz to 100 kHz		21.5 mV + 0.24 % of Reading	



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Equipment to Measure AC Voltage At the Listed Frequencies ^{FO}			Fluke 5500A	
45 Hz to 1 kHz	33 V to 330 V	39.6 mV + 0.05 % of Reading		
1 kHz to 10 kHz		30 mV + 0.08 % of Reading		
10 kHz to 20 kHz		30 mV + 0.09 % of Reading		
Equipment to Measure AC Voltage At the Listed Frequencies ^{FO}				Fluke 5500A
45 Hz to 1 kHz	330 V to 1 020 V	130 mV + 0.05 % of Reading		
1 kHz to 5 kHz		100 mV + 0.2 % of Reading		
5 kHz to 10 kHz		500 mV + 0.2 % of Reading		
Equipment to Output DC Current ^{FO}			Hewlett Packard 3458A Opt 002	
	0.13 nA to 100 nA	0.04 nA + 0.003 5 % of Reading		
	100 nA to 1 μ A	0.04 nA + 0.002 5 % of Reading		
	1 μ A to 10 μ A	0.1 nA + 0.002 5 % of Reading		
	10 μ A to 100 μ A	0.8 nA + 0.002 5 % of Reading		
	100 μ A to 1 mA	5 nA + 0.002 5 % of Reading		
	1 mA to 10 mA	50 nA + 0.002 5 % of Reading		
	10 mA to 100 mA	0.5 μ A + 0.004 % of Reading		
	100 mA to 1 A	10 μ A + 0.012 % of Reading		
Equipment to Measure DC Current ^{FO}			Fluke 5500A	
	3.3 mA to 33 mA	0.25 μ A + 0.01 % of Reading		
	33 mA to 330 mA	3.3 μ A + 0.01 % of Reading		
	0.33 A to 2.2 A	44 μ A + 0.03 % of Reading		
	2.2 A to 11 A	330 μ A + 0.06 % of Reading		
	11 A to 16.5 A	0.002 A + 0.25 % of Reading		Fluke 5500A Coil
	16.5 A to 150 A	0.015 A + 0.25 % of Reading		
	150 A to 550 A	0.05 A + 0.25 % of Reading		



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Equipment to Output AC Current At the Listed Frequencies ^{FO}			Hewlett Packard 3458A Opt 002
10 Hz to 20 Hz	1.3 μ A to 100 μ A	0.03 μ A + 0.4 % of Reading	
20 Hz to 45 Hz	0.51 μ A to 100 μ A	0.03 μ A + 0.15 % of Reading	
45 Hz to 5 kHz	0.24 μ A to 100 μ A	0.03 μ A + 0.06 % of Reading	
Equipment to Output AC Current At the Listed Frequencies ^{FO}			
10 Hz to 20 Hz	100 μ A to 1 mA	0.2 μ A + 0.4 % of Reading	
20 Hz to 45 Hz		0.2 μ A + 0.15 % of Reading	
45 Hz to 100 Hz		0.2 μ A + 0.06 % of Reading	
100 Hz to 5 kHz		0.2 μ A + 0.03 % of Reading	
5 kHz to 20 kHz		0.2 μ A + 0.06 % of Reading	
20 kHz to 50 kHz		0.4 μ A + 0.4 % of Reading	
50 kHz to 100 kHz		1.5 μ A + 0.55 % of Reading	
Equipment to Output AC Current At the Listed Frequencies ^{FO}			
10 Hz to 20 Hz	1 mA to 10 mA	2 μ A + 0.4 % of Reading	
20 Hz to 45 Hz		2 μ A + 0.15 % of Reading	
45 Hz to 100 Hz		2 μ A + 0.06 % of Reading	
100 Hz to 5 kHz		2 μ A + 0.03 % of Reading	
5 kHz to 20 kHz		2 μ A + 0.06 % of Reading	
20 kHz to 50 kHz		4 μ A + 0.4 % of Reading	
50 kHz to 100 kHz		15 μ A + 0.55 % of Reading	
Equipment to Output AC Current At the Listed Frequencies ^{FO}			
10 Hz to 20 Hz	10 mA to 100 mA	20 μ A + 0.4 % of Reading	
20 Hz to 45 Hz		20 μ A + 0.15 % of Reading	
45 Hz to 100 Hz		20 μ A + 0.06 % of Reading	
100 Hz to 5 kHz		20 μ A + 0.03 % of Reading	
5 kHz to 20 kHz		20 μ A + 0.06 % of Reading	
20 kHz to 50 kHz		40 μ A + 0.4 % of Reading	
50 kHz to 100 kHz		150 μ A + 0.55 % of Reading	



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Equipment to Output AC Current At the Listed Frequencies ^{FO}			Hewlett Packard 3458A Opt 002
10 Hz to 20 Hz	100 mA to 1 A	0.2 mA + 0.4 % of Reading	
20 Hz to 45 Hz		0.2 mA + 0.16 % of Reading	
45 Hz to 100 Hz		0.2 mA + 0.08 % of Reading	
100 Hz to 5 kHz		0.2 mA + 0.1 % of Reading	
5 kHz to 20 kHz		0.2 mA + 0.3 % of Reading	
20 kHz to 50 kHz		0.4 mA + 1 % of Reading	
Equipment to Measure AC Current At the Listed Frequencies ^{FO}			Fluke 5500A
10 Hz to 20 Hz	0.029 mA to 0.329 99 mA	0.23 μ A + 0.25 % of Reading	
20 Hz to 45 Hz		0.49 μ A + 0.13 % of Reading	
45 Hz to 1 kHz		0.58 μ A + 0.13 % of Reading	
1 kHz to 5 kHz		0.64 μ A + 0.4 % of Reading	
5 kHz to 10 kHz		1.35 μ A + 1.25 % of Reading	
Equipment to Measure AC Current At the Listed Frequencies ^{FO}			
10 Hz to 20 Hz	0.33 mA to 3.3 mA	0.76 μ A + 0.2 % of Reading	
20 Hz to 45 Hz		0.8 μ A + 0.1 % of Reading	
45 Hz to 1 kHz		0.72 μ A + 0.1 % of Reading	
1 kHz to 5 kHz		0.79 μ A + 0.2 % of Reading	
5 kHz to 10 kHz		0.79 μ A + 0.6 % of Reading	
Equipment to Measure AC Current At the Listed Frequencies ^{FO}			
10 Hz to 20 Hz	3.3 mA to 33 mA	3 μ A + 0.2 % of Reading	
20 Hz to 45 Hz		3 μ A + 0.1 % of Reading	
45 Hz to 1 kHz		3 μ A + 0.09 % of Reading	
1 kHz to 5 kHz		3 μ A + 0.2 % of Reading	
5 kHz to 10 kHz		3 μ A + 0.6 % of Reading	
Equipment to Measure AC Current At the Listed Frequencies ^{FO}			
10 Hz to 20 Hz	33 mA to 330 mA	30 μ A + 0.2 % of Reading	
20 Hz to 45 Hz		30 μ A + 0.1 % of Reading	
45 Hz to 1 kHz		30 μ A + 0.09 % of Reading	
1 kHz to 5 kHz		30 μ A + 0.2 % of Reading	
5 kHz to 10 kHz		30 μ A + 0.6 % of Reading	



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Equipment to Measure AC Current At the Listed Frequencies ^{FO}			Fluke 5500A
10 Hz to 45 Hz	0.33 A to 2.2 A	300 μ A + 0.2 % of Reading	
45 Hz to 1 kHz		300 μ A + 0.1 % of Reading	
1 kHz to 5 kHz		300 μ A + 0.75 % of Reading	
Equipment to Measure AC Current At the Listed Frequencies ^{FO}			Fluke 5500A/Coil
45 Hz to 65 Hz	2.2 A to 11 A	2 000 μ A + 0.06 % of Reading	
65 Hz to 500 Hz		2 000 μ A + 0.1 % of Reading	
500 Hz to 1 kHz		2 000 μ A + 0.33 % of Reading	
Equipment to Measure AC Current At the Listed Frequencies ^{FO}			Fluke 5500A/Coil
45 Hz to 65 Hz	10 A to 16.5 A	0.003 A + 0.28 % of Reading	
65 Hz to 440 Hz		0.003 A + 0.79 % of Reading	
Equipment to Measure AC Current At the Listed Frequencies ^{FO}			Fluke 5500A/Coil
45 Hz to 65 Hz	16.5 A to 150 A	0.025 A + 0.28 % of Reading	
65 Hz to 440 Hz		0.027 A + 0.79 % of Reading	
Equipment to Measure AC Current At the Listed Frequencies ^{FO}			Fluke 5500A/Coil
45 Hz to 65 Hz	150 A to 550 A	0.09 A + 0.28 % of Reading	
65 Hz to 440 Hz		0.1 A + 0.79 % of Reading	
Equipment to Output Resistance ^{FO}			Hewlett Packard 3458A Opt 002
0.005 Ω to 10 Ω		0.000 05 Ω + 0.001 8 % of Reading	
10 Ω to 100 Ω		0.000 05 Ω + 0.001 5 % of Reading	
100 Ω to 1 k Ω		0.000 05 Ω + 0.001 3 % of Reading	
1 k Ω to 10 k Ω		0.005 Ω + 0.001 3 % of Reading	
10 k Ω to 100 k Ω		0.05 Ω + 0.001 3 % of Reading	
100 k Ω to 1 M Ω		2 Ω + 0.001 8 % of Reading	
1 M Ω to 10 M Ω		100 Ω + 0.005 3 % of Reading	
10 M Ω to 100 M Ω		1 k Ω + 0.051 % of Reading	
100 M Ω to 1 G Ω		10 k Ω + 0.51 % of Reading	



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Equipment to Measure Resistance ^{FO}	50 m Ω to 11 Ω	0.008 Ω + 0.012 % of Reading	Fluke 5500A
	11 Ω to 33 Ω	0.015 Ω + 0.012 % of Reading	
	33 Ω to 110 Ω	0.015 Ω + 0.009 % of Reading	
	110 Ω to 330 Ω	0.015 Ω + 0.009 % of Reading	
	330 Ω to 1.1 k Ω	0.061 Ω + 0.009 % of Reading	
	1.1 k Ω to 3.3 k Ω	0.078 Ω + 0.009 % of Reading	
	3.3 k Ω to 11 k Ω	0.66 Ω + 0.009 % of Reading	
	11 k Ω to 33 k Ω	0.81 Ω + 0.009 % of Reading	
Equipment to Measure Capacitance ^{FO}	0.33 nF to 11 nF	0.01 nF + 0.5 % of Reading	
	11 nF to 110 nF	0.01 nF + 0.25 % of Reading	
	110 nF to 330 nF	0.3 nF + 0.25 % of Reading	
	0.33 μ F to 1.1 μ F	1 nF + 0.25 % of Reading	
	1.1 μ F to 3.3 μ F	3 nF + 0.35 % of Reading	
	3.3 μ F to 11 μ F	10 nF + 0.35 % of Reading	
	11 μ F to 33 μ F	30 nF \pm 0.4 % of Reading	
	33 μ F to 110 μ F	100 nF + 0.5 % of Reading	
	110 μ F to 330 μ F	300 nF + 0.7 % of Reading	
	330 μ F to 1.1 mF	300 nF + 1 % of Reading	
Equipment to Measure Inductance: Fixed Points At the Listed Frequencies ^{FO}			General Radio 1482-L
100 Hz	100 mH	0.12 mH	
200 Hz	100 mH	0.12 mH	
400 Hz	100 mH	0.12 mH	
1 000 Hz	100 mH	0.12 mH	
10 kHz	100 mH	0.13 mH	



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Temperature Calibration, Indication, and Control Equipment used with Thermocouple Type B ^{FO}	250 °C to 350 °C	0.95 °C	Ectron 1140A
	350 °C to 445 °C	0.74 °C	
	445 °C to 580 °C	0.58 °C	
	580 °C to 750 °C	0.45 °C	
	750 °C to 1 000 °C	0.37 °C	
	1 000 °C to 1 820 °C	0.17 °C	
Temperature Calibration, Indication, and Control Equipment used with Thermocouple Type E ^{FO}	-270 °C to -245 °C	1.2 °C	
	-245 °C to -195 °C	0.18 °C	
	-195 °C to -155 °C	0.1 °C	
	-155 °C to -90 °C	0.08 °C	
	-90 °C to 15 °C	0.07 °C	
	15 °C to 890 °C	0.06 °C	
	890 °C to 1 000 °C	0.07 °C	
Temperature Calibration, Indication, and Control Equipment used with Thermocouple Type J ^{FO}	-210 °C to -180 °C	0.12 °C	
	-180 °C to -120 °C	0.1 °C	
	-120 °C to -50 °C	0.08 °C	
	990 °C to 1 200 °C	0.07 °C	
Temperature Calibration, Indication, and Control Equipment used with Thermocouple Type K ^{FO}	-270 °C to -255 °C	2.2 °C	
	-225 °C to -195 °C	0.7 °C	
	-195 °C to 115 °C	0.12 °C	
	-115 °C to -55 °C	0.09 °C	
	-55 °C to 1 000 °C	0.07 °C	
	1 000 °C to 1 372 °C	0.08 °C	
Temperature Calibration, Indication, and Control Equipment used with Thermocouple Type N ^{FO}	-270 °C to -260 °C	5 °C	
	-260 °C to -200 °C	1 °C	
	-200 °C to -140 °C	0.23 °C	
	-140 °C to -70 °C	0.15 °C	
	-70 °C to 25 °C	0.12 °C	
	25 °C to 160 °C	0.1 °C	
	160 °C to 1 300 °C	0.09 °C	



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Accuserve, Inc.

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 Contact Name: Michael Griffith Phone: (704) 535-0100

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 R ^{FO}	-50 °C to -30 °C	0.65 °C	Ectron 1140A
	-30 °C to 45 °C	0.55 °C	
	45 °C to 160 °C	0.4 °C	
	160 °C to 380 °C	0.3 °C	
	380 °C to 775 °C	0.26 °C	
	775 °C to 1 768.1 °C	0.22 °C	
Temperature Calibration, Indication, and Control Equipment used with Thermocouple Type S ^{FO}	-50 °C to -30 °C	0.62 °C	
	-30 °C to 45 °C	0.56 °C	
	45 °C to 105 °C	0.4 °C	
	105 °C to 310 °C	0.33 °C	
	310 °C to 615 °C	0.29 °C	
	615 °C to 1768.1 °C	0.26 °C	
Temperature Calibration, Indication, and Control Equipment used with Thermocouple Type T ^{FO}	-270 °C to -255 °C	1.8 °C	
	-255 °C to -240 °C	0.49 °C	
	-240 °C to -210 °C	0.3 °C	
	-210 °C to -150 °C	0.18 °C	
	-150 °C to -40 °C	0.12 °C	
	-40 °C to 100 °C	0.08 °C	
Temperature Calibration, Equipment to Measure RTD Type Pt 385, 100 Ω ^{FO}	100 °C to 400 °C	0.07 °C	Fluke 5500A
	-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	
Oscilloscope – Amplitude Flatness ^{FO}	250 kHz to 100 MHz	1 % of the Reference Frequency Amplitude	Tektronix SG503
	100 MHz to 250 MHz	3 % of the Reference Frequency Amplitude	
	250 MHz to 990 MHz	1 dB at 0 dB	HP 8656B
Oscilloscope – Amplitude V _{pp} (1 M Ω Output Impedance) ^{FO}	V _{pp} = 5 mV to 100 V	1 μ V + 0.25 % of Reading	Tektronix PG506
Oscilloscope – Time Markers ^{FO}	1 nS to 5 S in a 1,2,5 Sequence	0.001 % of Reading	Tektronix TG501



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

Mass, Force, and Weighing

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
Analytical Balances ^{FO}	50 g to 500 g	$(4.44 \times 10^{-4} + 3 \times 10^{-6}Wt)$ g	Class 1 Weights
Electronic Balances ^{FO}	50 g to 2 000 g	$(1.15 \times 10^{-2} + 1 \times 10^{-6}Wt)$ g	

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
Pressure ^{FO} (Gage)	0 kPa to 6.89 kPa (0 psi to 1 psi)	0.014 kPa (0.002 psi)	Fluke 700P22
	0 kPa to 2 068 kPa (0 psi to 300 psi)	0.6 kPa (0.087 psi)	Druck DPI 610
	0 kPa to 6 894 kPa (0 psi to 1 000 psi)	4 kPa (0.58 psi)	Fluke 700P08
	0 kPa to 34 473 kPa (0 psi to 5 000 psi)	32 kPa (4.6 psi)	Fluke 700P30
Vacuum ^{FO}	-755 mmHg to -2.5 mmHg (-29.72 inHg to -0.098 inHg)	0.76 mmHg (0.029 9 inHg)	Druck DPI 610
Torque Tools ^{FO}	2.825 N•m to 28.25 N•m (25 lbf•in to 250 lbf•in)	0.113 N•m 1 lbf•in	Mountz BMX250I
	33.9 N•m to 339 N•m (25 lbf•ft to 250 lbf•ft)	1.36 N•m 1 lbf•ft	Mountz BMX250F

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 Output Temperature ^{FO}	0 °C to 50 °C	0.029 °C	Hart Scientific 1521 w/ 5610
	50 °C to 75 °C	0.035 °C	
	75 °C to 100 °C	0.05 °C	
	-196 °C to 100 °C	0.075 °C	Hart Scientific 1521 w/ 5618B
	100 °C to 400 °C	0.1 °C	
	400 °C to 500 °C	0.15 °C	



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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 RH ^{FO} (Fixed points)	11.3 % RH	1 % RH	Vaisala 19729HM, Vaisala 19731HM
	75 % RH	1.5 % RH	
Equipment to Output RH ^{FO}	10 % RH to 90 % RH	1.2 % RH	Vaisala HMI41 w/ HMP46
Temperature Infrared Thermometer ^{FO}	50 °C to 500 °C	1.8 °C	CEM BX-500

Time & Frequency

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
Stopwatches and Timers ^{FO}	5 min to 180 min	0.098 sec	Hewlett Packard 53181A
Tachometers, Mechanical ^{FO}	575 rpm to 3 500 rpm	0.4 rpm	Automation Direct CCT-AN-A120 Counter
Tachometers, Photo ^{FO}	60 rpm to 100 000 rpm	1.2 rpm	Fluke 5500A

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 FO means that the laboratory performs calibration of the indicated parameter both at its fixed location and onsite at customer locations. Example: Outside Micrometer ^{FO} would mean that the laboratory performs this calibration at its fixed location and onsite at customer locations.
4. 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.



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5. The term Wt represents weight in pounds or grams (including SI multiple and submultiple units) appropriate to the uncertainty statement.
6. The term L represents length in inches or millimeters as appropriate to the uncertainty statement.

