



PERRY JOHNSON LABORATORY ACCREDITATION, INC.

Certificate of Accreditation

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

Acculab Measurement Standards, Inc.
40B Cherry Hill Drive, Danvers, MA 01923

(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):

***Dimensional, Electrical, Mass, Force, & Weighing Devices,
Mechanical, Time & Frequency and Thermodynamic Calibration***
(As detailed in the supplement)

Accreditation claims for such testing and/or calibration services shall only be made from addresses referenced within this certificate. This Accreditation is granted subject to the system rules governing the Accreditation referred to above, and the Organization hereby covenants with the Accreditation body's duty to observe and comply with the said rules.

For PJLA:

Tracy Szerszen
President/Operations Manager

Initial Accreditation Date:

October 1, 2015

Issue Date:

October 1, 2015

Expiration Date:

October 1, 2017

Accreditation No:

73846

Certificate No:

L15-320

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.pjlabs.com



Certificate of Accreditation: Supplement

Acculab Measurement Standards, Inc.

40B Cherry Hill Drive, Danvers, MA 01923

Contact Name: Jim Jezowski, Jr. Phone: 978-750-4555

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

Dimensional

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
Micrometer ^{FO}	Up to 6 in	5 μ in + 3L μ in	Grade 1 Gage Blocks
	6 in to 24 in	25 μ in + 10L μ in	
Calipers ^{FO}	Up to 8 in	280 μ in	Grade 1 Gage Blocks
	8 in to 14 in	340 μ in	
	14 in to 20 in	390 μ in	
	20 in to 24 in	440 μ in	
Test Indicators ^{FO}	Up to 6 in	51 μ in	Grade 1 Gage Blocks
Height Gage ^{FO}	Up to 6 in	120 μ in	Grade AA Surface Plate
	6 in to 12 in	190 μ in	
	12 in to 18 in	280 μ in	
	18 in to 24 in	370 μ in	
Ring Gage, Plain ^F	Up to 1 in	22 μ in	Grade 1 Gage Blocks Trimos Tulm 210
	1 in to 2 in	34 μ in	
	2 in to 3 in	48 μ in	
	3 in to 4 in	62 μ in	
	4 in to 5 in	77 μ in	
	5 in to 6 in	91 μ in	
Pin Gages ^{FO}	Up to 1 in	22 μ in	Trimos Tulm 210
	1 in to 2 in	23 μ in	
Thread Wires ^{FO}	Up to 0.5 in	14 μ in	
Cylindrical Plugs ^{FO}	Up to 1 in	23 μ in	Trimos Tulm 210
	1 in to 2 in	23 μ in	
	2 in to 3 in	24 μ in	
	3 in to 4 in	24 μ in	
	4 in to 5 in	26 μ in	
	5 in to 6 in	27 μ in	
	6 in to 7 in	28 μ in	
	7 in to 8 in	29 μ in	
	8 in to 9 in	31 μ in	
9 in to 10 in	32 μ in		
Gage Blocks ^{FO}	Up to 12 in	3 μ in + 5L μ in	Trimos Tulm 210



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Thread Plug Gage Pitch Diameter ^F (4 in to 80 in) Threads per in and (0.25 mm to 6 mm)	Up to 1 in	54 μ m	Trimos Tulm 210, SPI Thread Wires
	1 in to 2 in	59 μ m	
	2 in to 3 in	68 μ m	
	3 in to 4 in	79 μ m	
	4 in to 5 in	90 μ m	
	5 in to 6 in	100 μ m	
	6 in to 7 in	120 μ m	
	7 in to 8 in	130 μ m	
	8 in to 9 in	140 μ m	
Thread Plugs Major Diameter ^F	Up to 1 in	22 μ m	Trimos Tulm 210
	1 in to 2 in	23 μ m	
	2 in to 3 in	24 μ m	
	3 in to 4 in	24 μ m	
	4 in to 5 in	26 μ m	
	5 in to 6 in	27 μ m	
	6 in to 7 in	28 μ m	
	7 in to 8 in	29 μ m	
	8 in to 9 in	31 μ m	
9 in to 10 in	32 μ m		

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 Output DC Voltage ^{FO}	Up to 120 mV	5 μ V/V + 0.36 μ V	Fluke 5700A w/ HP 3458A Opt 003
	120 mV to 1.2 V	4 μ V/V + 0.3 μ V	
	1.2 V to 12 V	4 μ V/V + 0.5 μ V	
	120 V to 1 kV	6 μ V/V + 0.1 mV	
	Up to 120 mV	5 μ V/V + 0.36 μ V	
	120 mV to 1.2 V	4 μ V/V + 0.3 μ V	
	1.2 V to 12 V	4 μ V/V + 0.5 μ V	
	120 V to 1 kV	6 μ V/V + 0.1 mV	



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Equipment to Output DC Voltage ^F (Fixed Values)	1 V	25 μ V/V	Fluke 732A
	1.02 V	25 μ V/V	
	10 V	7 μ V/V	
Equipment to Measure DC Voltage ^{FO}	Up to 120 mV	5 μ V/V + 0.36 μ V	HP 3458 Opt 002
	120 mV to 1.2 V	4 μ V/V + 0.3 μ V	
	1.2 V to 12 V	4 μ V/V + 0.5 μ V	
	12 V to 120 V	6 μ V/V + 36 μ V	
	120 V to 1 kV	6 μ V/V + 0.1 mV	
Equipment to Output AC Voltage (At the listed frequencies) ^{FO}			
10 Hz to 40 Hz	Up to 12 mV	0.3 mV/V + 3 μ V	Fluke 5700A-03 HP 3458A Opt 002
40 Hz to 1 kHz	Up to 12 mV	0.3 mV/V + 11 μ V	
1 kHz to 20 kHz	Up to 12 mV	0.25 mV/V + 6 μ V	
20 kHz to 50 kHz	Up to 12 mV	2.5 mV/V + 6 μ V	
50 kHz to 100 kHz	Up to 12 mV	5 mV/V + 54 μ V	
100 kHz to 300 kHz	Up to 12 mV	40 mV/V + 0.41 mV	
Equipment to Output AC Voltage (At the listed frequencies) ^{FO}			
10 Hz to 40 Hz	12 mV to 120 mV	70 μ V/V + 12 μ V	Fluke 5700A-03 HP 3458A Opt 002
40 Hz to 1 kHz	12 mV to 120 mV	70 μ V/V + 12 μ V	
1 kHz to 20 kHz	12 mV to 120 mV	0.14 mV/V + 13 μ V	
20 kHz to 50 kHz	12 mV to 120 mV	0.3 mV/V + 20 μ V	
50 kHz to 100 kHz	12 mV to 120 mV	0.8 mV/V + 85 μ V	
100 kHz to 300 kHz	12 mV to 120 mV	3 mV/V + 0.31 mV	
300 kHz to 1 MHz	12 mV to 120 mV	10 mV/V + 1.1 mV	



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Equipment to Output AC Voltage (At the listed frequencies) ^{FO}			
10 Hz to 40 Hz	120 mV to 1.2 V	70 μ V/V + 0.11 mV	Fluke 5700A-03 HP 3458A Opt 002
40 Hz to 1 kHz	120 mV to 1.2 V	70 μ V/V + 0.11 mV	
1 kHz to 20 kHz	120 mV to 1.2 V	0.14 mV/V + 0.18 mV	
20 kHz to 50 kHz	120 mV to 1.2 V	0.3 mV/V + 0.34 mV	
50 kHz to 100 kHz	120 mV to 1.2 V	0.8 mV/V + 0.84 mV	
100 kHz to 300 kHz	120 mV to 1.2 V	3 mV/V + 3.1 mV	
300 kHz to 1 MHz	120 mV to 1.2 V	10 mV/V + 11 mV	
Equipment to Output AC Voltage (At the listed frequencies) ^{FO}			
10 Hz to 40 Hz	1.2 V to 12 V	70 μ V/V + 1.3 mV	Fluke 5700A-03 HP 3458A Opt 002
40 Hz to 1 kHz	1.2 V to 12 V	70 μ V/V + 1.1 mV	
1 kHz to 20 kHz	1.2 V to 12 V	0.14 mV/V + 1.8 mV	
20 kHz to 50 kHz	1.2 V to 12 V	0.3 mV/V + 3.3 mV	
50 kHz to 100 kHz	1.2 V to 12 V	0.8 mV/V + 8.5 mV	
100 kHz to 300 kHz	1.2 V to 12 V	3 mV/V + 32 mV	
300 kHz to 1 MHz	1.2 V to 12 V	10 mV/V + 0.1 V	
Equipment to Output AC Voltage (At the listed frequencies) ^{FO}			
10 Hz to 40 Hz	12 V to 120 V	0.2 mV/V + 23 mV	Fluke 5700A-03 HP 3458A Opt 002
40 Hz to 1 kHz	12 V to 120 V	0.2 mV/V + 23 mV	
1 kHz to 20 kHz	12 V to 120 V	0.2 mV/V + 23 mV	
20 kHz to 50 kHz	12 V to 120 V	0.35 mV/V + 39 mV	
50 kHz to 100 kHz	12 V to 120 V	1.2 mV/V + 0.13 V	
Equipment to Output AC Voltage (At the listed frequencies) ^{FO}			
50 Hz to 1 kHz	220 V to 1.1 kV	0.4 mV/V + 0.11 V	Fluke 5700A-03 HP 3458A Opt 002
Equipment to Measure AC Voltage (At the listed frequencies) ^{FO}			
10 Hz to 40 Hz	Up to 12 mV	0.3 mV/V + 7 μ V	HP 3458A Opt 002
40 Hz to 1 kHz	Up to 12 mV	0.2 mV/V + 6 μ V	
1 kHz to 20 kHz	Up to 12 mV	0.3 mV/V + 6 μ V	
20 kHz to 50 kHz	Up to 12 mV	1 mV/V + 6 μ V	
50 kHz to 100 kHz	Up to 12 mV	5 mV/V + 54 μ V	
100 kHz to 300 kHz	Up to 12 mV	40 mV/V + 0.41 mV	



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Equipment to Measure AC Voltage (At the listed frequencies) ^{FO}			
10 Hz to 40 Hz	12 mV to 120 mV	70 μ V/V + 12 μ V	HP 3458A Opt 002
40 Hz to 1 kHz	12 mV to 120 mV	70 μ V/V + 12 μ V	
1 kHz to 20 kHz	12 mV to 120 mV	0.14 mV/V + 13 μ V	
20 kHz to 50 kHz	12 mV to 120 mV	0.3 mV/V + 20 μ V	
50 kHz to 100 kHz	12 mV to 120 mV	0.8 mV/V + 85 μ V	
100 kHz to 300 kHz	12 mV to 120 mV	3 mV/V + 0.31 mV	
300 kHz to 1 MHz	12 mV to 120 mV	10 mV/V + 1.1 mV	
Equipment to Measure AC Voltage (At the listed frequencies) ^{FO}			
10 Hz to 40 Hz	120 mV to 1.2 V	70 μ V/V + 1.3 mV	HP 3458A Opt 002
40 Hz to 1 kHz	120 mV to 1.2 V	70 μ V/V + 1.1 mV	
1 kHz to 20 kHz	120 mV to 1.2 V	0.14 mV/V + 0.18 mV	
20 kHz to 50 kHz	120 mV to 1.2 V	0.3 mV/V + 0.34 mV	
50 kHz to 100 kHz	120 mV to 1.2 V	0.8 mV/V + 0.84 mV	
100 kHz to 300 kHz	120 mV to 1.2 V	3 mV/V + 3.1 mV	
300 kHz to 1 MHz	120 mV to 1.2 V	10 mV/V + 11 mV	
Equipment to Measure AC Voltage (At the listed frequencies) ^{FO}			
10 Hz to 40 Hz	1.2 V to 12 V	70 μ V/V + 1.3 mV	HP 3458A Opt 002
40 Hz to 1 kHz	1.2 V to 12 V	70 μ V/V + 1.1 mV	
1 kHz to 20 kHz	1.2 V to 12 V	0.14 mV/V + 1.8 mV	
20 kHz to 50 kHz	1.2 V to 12 V	0.3 mV/V + 3.3 mV	
50 kHz to 100 kHz	1.2 V to 12 V	0.8 mV/V + 8.4 mV	
100 kHz to 300 kHz	1.2 V to 12 V	3 mV/V + 32 mV	
300 kHz to 1 MHz	1.2 V to 12 V	10 mV/V + 0.1 V	
Equipment to Measure AC Voltage (At the listed frequencies) ^{FO}			
10 Hz to 40 Hz	12 V to 120 V	0.2 mV/V + 4.8 mV	HP 3458A Opt 002
40 Hz to 1 kHz	12 V to 120 V	0.2 mV/V + 2.4 mV	
1 kHz to 20 kHz	12 V to 120 V	0.2 mV/V + 2.4 mV	
20 kHz to 50 kHz	12 V to 120 V	0.35 mV/V + 2.4 mV	
50 kHz to 100 kHz	12 V to 120 V	1.2 mV/V + 2.4 mV	
100 kHz to 300 kHz	12 V to 120 V	4 mV/V + 12 mV	
300 kHz to 1 MHz	12 V to 120 V	15 mV/V + 12 mV	



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Equipment to Measure AC Voltage (At the listed frequencies) ^{FO}			
10 Hz to 40 Hz	120 V to 700 V	0.4 mV/V + 24 mV	HP 3458A Opt 002
40 Hz to 1 kHz	120 V to 700 V	0.4 mV/V + 24 mV	
1 kHz to 20 kHz	120 V to 700 V	0.6 mV/V + 24 mV	
20 kHz to 50 kHz	120 V to 700 V	1.2 mV/V + 39 mV	
50 kHz to 100 kHz	120 V to 700 V	3 mV/V + 0.31 V	
Equipment to Output Resistance ^{FO}	1 Ω	4.1 $\mu\Omega$	Guildline 9330-1
	10 Ω	0.21 M Ω	Guildline 9330-10
	100 Ω	1.8 M Ω	Guildline 9330-100
	1 k Ω	11 M Ω	Guildline 9330-1k
	10 k Ω	41 M Ω	Guildline 9330-10k
	100 k Ω	1.1 Ω	Guildline 9330-100k
	1 M Ω	17 Ω	Guildline 9330-1M
	10 M Ω	0.72 k Ω	Guildline 9330-10M
Equipment to Measure Resistance ^{FO}	Up to 12 Ω	15 $\mu\Omega/\Omega$ + 60 $\mu\Omega$	HP 3458A Opt 002
	12 Ω to 120 Ω	12 $\mu\Omega/\Omega$ + 0.6 M Ω	
	120 Ω to 1.2 k Ω	10 $\mu\Omega/\Omega$ + 0.6 M Ω	
	1.2 k Ω to 12 k Ω	10 $\mu\Omega/\Omega$ + 6 M Ω	
	12 k Ω to 120 k Ω	10 $\mu\Omega/\Omega$ + 60 M Ω	
	120 Ω to 1.2 M Ω	15 $\mu\Omega/\Omega$ + 2.4 Ω	
	1.2 M Ω to 12 M Ω	60 $\mu\Omega/\Omega$ + 0.12 k Ω	
	12 M Ω to 120 M Ω	5 M Ω/Ω + 1.2 k Ω	
Equipment to Output DC Current ^{FO}	Up to 120 μ A	20 μ A/A + 0.96 nA	HP 3458A Opt 002 Fluke 5700A
	120 μ A to 1.2 mA	20 μ A/A + 6 nA	
	1.2 mA to 12 mA	20 μ A/A + 60 nA	
	12 mA to 120 mA	35 μ A/A + 0.60 μ A	
	120 mA to 1 A	0.1 mA/A + 10 μ A	
Equipment to Measure DC Current ^{FO}	Up to 120 μ A	20 μ A/A + 0.96 nA	HP 3458A Opt 002
	120 μ A to 1.2 mA	20 μ A/A + 6 nA	
	1.2 mA to 12 mA	20 μ A/A + 60 nA	
	12 mA to 120 mA	35 μ A/A + 0.6 μ A	
	120 mA to 1 A	0.1 mA/A + 10 μ A	



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Equipment to Output AC Current (At the listed frequencies) ^{FO}			
10 Hz to 20 Hz	Up to 120 μ A	4 mA/A + 30 nA	Fluke 5700A-03 HP 3458A Opt 002
20 Hz to 45 Hz	Up to 120 μ A	1.5 mA/A + 30 nA	
45 Hz to 5 kHz	Up to 120 μ A	0.6 mA/A + 30 nA	
Equipment to Output AC Current (At the listed frequencies) ^{FO}			
10 Hz to 20 Hz	120 μ A to 1.2 mA	4 mA/A + 0.2 μ A	Fluke 5700A-03 HP 3458A Opt 002
20 Hz to 45 Hz	120 μ A to 1.2 mA	1.5 mA/A + 0.2 μ A	
45 Hz to 100 Hz	120 μ A to 1.2 mA	0.6 mA/A + 0.2 μ A	
100 Hz to 5 kHz	120 μ A to 1.2 mA	0.3 mA/A + 0.2 μ A	
5 kHz to 20 kHz	120 μ A to 1.2 mA	0.6 mA/A + 0.2 μ A	
Equipment to Output AC Current (At the listed frequencies) ^{FO}			
10 Hz to 20 Hz	1.2 mA to 12 mA	4 mA/A + 0.2 μ A	Fluke 5700A-03 HP 3458A Opt 002
20 Hz to 45 Hz	1.2 mA to 12 mA	1.5 mA/A + 0.2 μ A	
45 Hz to 100 Hz	1.2 mA to 12 mA	0.6 mA/A + 0.2 μ A	
100 Hz to 5 kHz	1.2 mA to 12 mA	0.3 mA/A + 0.2 μ A	
5 kHz to 20 kHz	1.2 mA to 12 mA	0.6 mA/A + 0.2 μ A	
Equipment to Output AC Current (At the listed frequencies) ^{FO}			
10 Hz to 20 Hz	12 mA to 120 mA	4 mA/A + 0.2 μ A	Fluke 5700A-03 HP 3458A Opt 002
20 Hz to 45 Hz	12 mA to 120 mA	1.5 mA/A + 0.2 μ A	
45 Hz to 100 Hz	12 mA to 120 mA	0.6 mA/A + 0.2 μ A	
100 Hz to 5 kHz	12 mA to 120 mA	0.3 mA/A + 0.2 μ A	
5 kHz to 20 kHz	12 mA to 120 mA	0.6 mA/A + 0.2 μ A	
Equipment to Output AC Current (At the listed frequencies) ^{FO}			
20 Hz to 45 Hz	120 mA to 1 A	1.6 mA/A + 20 μ A	Fluke 5700A-03 HP 3458A Opt 002
45 Hz to 100 Hz	120 mA to 1 A	0.8 mA/A + 20 μ A	
100 Hz to 5 kHz	120 mA to 1 A	1 mA/A + 20 μ A	
Equipment to Output AC Current (At the listed frequencies) ^{FO}			
45 Hz to 65 Hz	1 A to 11 A	0.6 mA/A + 2 mA	Fluke 5522A
65 Hz to 500 Hz	1 A to 11 A	1 mA/A + 2 mA	
500 Hz to 1 kHz	1 A to 11 A	3.3 mA/A + 2 mA	



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Equipment to Measure AC Current (At the listed frequencies) ^{FO}			
20 Hz to 45 Hz	10 μ A to 120 μ A	1.5 mA/A + 36 nA	HP 3458A Opt 002
45 Hz to 5 kHz	10 μ A to 120 μ A	0.6 mA/A + 36 nA	
Equipment to Measure AC Current (At the listed frequencies) ^{FO}			
20 Hz to 45 Hz	120 μ A to 1.2 mA	1.5 mA/A + 0.24 μ A	HP 3458A Opt 002
45 Hz to 100 Hz	120 μ A to 1.2 mA	0.6 mA/A + 0.24 μ A	
100 Hz to 5 kHz	120 μ A to 1.2 mA	0.3 mA/A + 0.24 μ A	
5 kHz to 20 kHz	120 μ A to 1.2 mA	0.6 mA/A + 0.24 μ A	
Equipment to Measure AC Current (At the listed frequencies) ^{FO}			
20 Hz to 45 Hz	1.2 mA to 12 mA	1.5 mA/A + 2.4 μ A	HP 3458A Opt 002
45 Hz to 100 Hz	1.2 mA to 12 mA	0.6 mA/A + 2.4 μ A	
100 Hz to 5 kHz	1.2 mA to 12 mA	0.3 mA/A + 2.4 μ A	
5 kHz to 20 kHz	1.2 mA to 12 mA	0.6 mA/A + 2.4 μ A	
Equipment to Measure AC Current (At the listed frequencies) ^{FO}			
20 Hz to 45 Hz	12 mA to 120 mA	1.5 mA/A + 24 μ A	HP 3458A Opt 002
45 Hz to 100 Hz	12 mA to 120 mA	0.6 mA/A + 24 μ A	
100 Hz to 5 kHz	12 mA to 120 mA	0.3 mA/A + 24 μ A	
5 kHz to 20 kHz	12 mA to 120 mA	0.6 mA/A + 24 μ A	
Equipment to Measure AC Current (At the listed frequencies) ^{FO}			
20 Hz to 45 Hz	120 mA to 1 A	1.6 mA/A + 0.24 mA	HP 3458A Opt 002
45 Hz to 100 Hz	120 mA to 1 A	0.8 mA/A + 0.24 mA	
100 Hz to 5 kHz	120 mA to 1 A	1 mA/A + 0.24 mA	
Temperature Calibration, Indication and Control Equipment used with Thermocouple Type B ^{FO}	600 °C to 800 °C	0.44 °C	Fluke 5522A
	800 °C to 1 000 °C	0.34 °C	
	1 000 °C to 1 550 °C	0.33 °C	
	1 550 °C to 1 820 °C	0.33 °C	
Temperature Calibration, Indication and Control Equipment used with Thermocouple Type C ^{FO}	0 °C to 150 °C	0.3 °C	Fluke 5522A
	150 °C to 650 °C	0.26 °C	
	650 °C to 1 000 °C	0.31 °C	
	1 000 °C to 1 800 °C	0.5 °C	
	1 800 °C to 2 316 °C	0.84 °C	



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Temperature Calibration, Indication and Control Equipment used with Thermocouple Type E ^{FO}	-210 °C to -100 °C	0.5 °C	Fluke 5522A Electrical Simulation of Thermocouple Output
	-100 °C to -30 °C	0.16 °C	
	-30 °C to 150 °C	0.14 °C	
	150 °C to 760 °C	0.16 °C	
	760 °C to 1 200 °C	0.21 °C	
Temperature Calibration, Indication and Control Equipment used with Thermocouple Type J ^{FO}	-200 °C to -100 °C	0.27 °C	
	-100 °C to -25 °C	0.16 °C	
	-25 °C to 350 °C	0.14 °C	
	350 °C to 650 °C	0.17 °C	
Temperature Calibration, Indication and Control Equipment used with Thermocouple Type K ^{FO}	650 °C to 1 000 °C	0.23 °C	
	-200 °C to -100 °C	0.33 °C	
	-100 °C to -25 °C	0.18 °C	
	-25 °C to 120 °C	0.16 °C	
Temperature Calibration, Indication and Control Equipment used with Thermocouple Type N ^{FO}	120 °C to 1 000 °C	0.26 °C	
	1 000 °C to 1 372 °C	0.4 °C	
	-200 °C to -100 °C	0.4 °C	
	-100 °C to -25 °C	0.22 °C	
	-25 °C to 120 °C	0.19 °C	
Temperature Calibration, Indication and Control Equipment used with Thermocouple Type R ^{FO}	120 °C to 410 °C	0.18 °C	
	410 °C to 1 300 °C	0.27 °C	
	0 °C to 250 °C	0.57 °C	
	250 °C to 400 °C	0.35 °C	
Temperature Calibration, Indication and Control Equipment used with Thermocouple Type S ^{FO}	400 °C to 1 000 °C	0.33 °C	
	1 000 °C to 1 767 °C	0.4 °C	
	0 °C	0.47 °C	
	250 °C to 400 °C	0.36 °C	
Temperature Calibration, Indication and Control Equipment used with Thermocouple Type T ^{FO}	400 °C to 1 000 °C	0.37 °C	
	1 000 °C to 1 767 °C	0.46 °C	
	-250 °C to -150 °C	0.63 °C	
	-150 °C to 0 °C	0.24 °C	
Temperature Calibration, Indication and Control Equipment used with Thermocouple Type T ^{FO}	0 °C to 120 °C	0.16 °C	
	120 °C to 400 °C	0.14 °C	



Certificate of Accreditation: Supplement

Acculab Measurement Standards, Inc.

40B Cherry Hill Drive, Danvers, MA 01923

Contact Name: Jim Jezowski, Jr. Phone: 978-750-4555

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
Temperature Calibration, Indication and Control Equipment used with RTD Pt 385 100 Ω ^{FO}	-200 °C to -80 °C	0.05 °C	Fluke 5522A HP 3458A Opt 002 Electrical Simulation of Thermocouple Output
	-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	0.14 °C	
Temperature Calibration, Indication and Control Equipment used with RTD Pt 3926 100 Ω ^{FO}	-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	
Temperature Calibration, Indication and Control Equipment used with RTD Pt 385 120 Ω ^{FO}	-80 °C to 0 °C	0.08 °C	
	0 °C to 100 °C	0.08 °C	
	100 °C to 260 °C	0.09 °C	
Temperature Calibration, Indication and Control Equipment used with RTD Pt 385 100 Ω ^{FO}	-200 °C to 800 °C	0.002 5 % of Resistance	
Devices to output High Voltage DC and 60Hz	1 kV to 6 kV	0.01kV/kV	Fluke 80k6 Fluke 87V
	6 kV to 25 kV	0.02kV/kV	Fluke 80k40 Fluke 87V
Capacitance: @ 1 kHz ^{FO}	100 nF	0.5 mF/F	GenRad 1409-T
Inductance: @ 1 kHz ^{FO}	100 mH	1.3 mH/H	GenRad 1482-L

Mass, Force, and Weighing Devices

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
Balances/Scales ^{FO}	Up to 500 mg	16 μ g	Rice Lake ASTM Class 1 and Troemner ASTM Class 1
	500 mg to 5 g	41 μ g	
	5 g to 10 g	60 μ g	
	10 g to 20 g	89 μ g	
	20 g to 50 g	0.14 mg	
	50 g to 35kg	2.7ug/g	



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

Mechanical

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
Pressure ^{FO}	1 psi to 100 psi	0.02 psi	Princo PPS-500
	100 to 1 000 psi	0.23 psi	Ametek T-100
	1 000 to 10 000 psi	2.3 psi	
Torque ^{FO}	Up to 100 lb-in	0.51 lb-in	AKO 650-B
	100 lb-in to 600 lb-ft	0.32 lb-ft	

Time and Frequency

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
Time and Frequency -Source ^F	10 MHz	2 parts in 10^{-12}	Hewlett Packard Z3805A GPS Disciplined Standard
	1 PPS		
	Up to 20 MHz	1 parts in 10^{-11}	HP Z3805A/HP 3325A
	20MHz to 2 GHz	1 parts in 10^{-11}	HP Z3805A/Marconi 2019
	2 GHz to 6.5 GHz	1 parts in 10^{-11}	HP Z3805A/HP 8683A
Time and Frequency -Measure ^F	Up to 100 MHz	2 parts in 10^{-10}	HP 5334A/HP Z3805A GPS Disciplined Standard
Time and Frequency -Measure	100 MHz to 1.3 GHz	2 parts in 10^{-10}	Fluke 7220A/HP Z3805A GPS Disciplined Standard HP 5351B/HP Z3805A GPS Disciplined Standard
	1.3GHz to 8 GHz		
Stopwatches/Timers	Up to 48 hours	1 parts in 10^{-9}	Timemometer

Thermodynamic

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
Relative Humidity ^F	11.31 % RH	0.37 % RH	Salt Solutions
	43.15 % RH	0.41 % RH	
	75.47 % RH	0.28 % RH	
Temperature Measure ^F	-190 °C to 0 °C	0.19 °C	Fluke 1523/5827A PRT
	0 °C to 200 °C	0.18 °C	
	200 °C to 300 °C	0.26 °C	
	300 °C to 410 °C	0.29 °C	



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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^F would mean that the laboratory performs this calibration at its fixed location.
4. 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.
5. 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.
6. The term L represents length in inches or millimeters as appropriate to the uncertainty statement.
7. The term P represents pressure in units appropriate to the uncertainty statement.
8. The term R represents Resolution of the unit under test.
9. The term T represents torque in N•m (including SI multiple and submultiple units) for the international system of units (the SI) or ozf•in, lbf•in and lbf•ft for the USC system of units.