



# PERRY JOHNSON LABORATORY ACCREDITATION, INC.

## Certificate of Accreditation

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

***American Valley Avionics and Calibration***  
***137 Industrial Loop South, Orange Park, FL 32073***

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

**ISO/IEC 17025:2017**

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):

***Dimensional, Electrical, Mass, Force, & Weighing Devices, Mechanical, Thermodynamic, and Time & Frequency 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

*Initial Accreditation Date:*

February 14, 2009

*Issue Date:*

August 12, 2023

*Expiration Date:*

September 30, 2025

*Accreditation No.:*

60048

*Certificate No.:*

L23-606

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

## American Valley Avionics and Calibration

137 Industrial Loop South, Orange Park, FL 32073

Contact: Matt Raulerson Phone: 904-644-8105

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

### 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 <sup>FO</sup>	25 mm to 330 mm	$(1.25 + 0.017L) \mu\text{m}$	Pratt & Whiney Lab Master Universal AVA-M01, M02
	331 mm to 570 mm	$(9.63 + 0.048L) \mu\text{m}$	Gage Blocks ASME B89.1.9 Grade 0 AVA-M01, M02
Gage Blocks <sup>FO</sup>	0.5 mm to 100 mm	$(0.46 + 0.002L) \mu\text{m}$	Pratt & Whiney Lab Master Universal AVA-GB01
	101 mm to 305 mm	$(0.21 + 0.006L) \mu\text{m}$	
Cylindrical Ring <sup>FO</sup>	10 mm to 330 mm	$(0.05 + 0.012L) \mu\text{m}$	AVA-48
Cylindrical Plug and Discs <sup>FO</sup>	0.25 mm to 305 mm	$(0.35 + 0.012L) \mu\text{m}$	AVA-64
Pin Gages <sup>FO</sup>	0.25 mm to 330 mm	$(0.35 + 0.012L) \mu\text{m}$	
Micrometer Standards <sup>FO</sup>	25 mm to 305 mm	$(0.33 + 0.005L) \mu\text{m}$	
	331 mm to 600 mm	$6.4 \mu\text{m}$	Fowler Z Cal 600 XT AVA-M01, M02
Bore Gages <sup>FO</sup>	6 mm to 300 mm	$25 \mu\text{m}$	Master Rings & Gauge Blocks
Calipers <sup>FO</sup>	25 mm to 305 mm	$(9 + 0.04L) \mu\text{m}$	Pratt & Whiney Lab Master Universal AVA-DC01
	331 mm to 610 mm	$21 \mu\text{m}$	Fowler Z_Cal 600 XT AVA-DC01
	610 mm to 2 540 mm	$130 \mu\text{m}$	Gage Blocks ASME B89.1.9 Grade 0 AVA-DC01
Indicators <sup>FO</sup>	0.05 mm to 100 mm	$3 \mu\text{m}$	Pratt & Whiney Lab Master Universal AVA-DI01
Height Gages <sup>FO</sup>	25 mm to 1 000 mm	$(5.3 + 0.026L) \mu\text{m}$	Gage Blocks ASME B89.1.9 Grade 0 AVA-43
Steel Rules <sup>FO</sup>	25 mm to 914 mm	$400 \mu\text{m}$	Gage Blocks ASME B89.1.9 Grade 2 AVA-75 AVA-76
Steel Tapes <sup>FO</sup>	25 mm to 3 650 mm	$500 \mu\text{m}$	

### 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 Measure DC Voltage <sup>FO</sup>	23 $\mu\text{V}$ to 329.999 9 mV	$1 \mu\text{V} + 20 \mu\text{V/V}$	Fluke 5520A GIDEP/METPRO
	330 mV to 3.299 99 V	$2 \mu\text{V} + 11 \mu\text{V/V}$	
	3.3 V to 32.999 99 V	$20 \mu\text{V} + 12 \mu\text{V/V}$	
	30 V to 329.999 9 V	$150 \mu\text{V} + 18 \mu\text{V/V}$	
	100 V to 1 000 V	$1.5 \text{ mV} + 18 \mu\text{V/V}$	



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Equipment to Output DC Voltage <sup>FO</sup>	0.3 $\mu$ V to 200 mV	0.1 $\mu$ V + 5 $\mu$ V/V	Fluke 8508A GIDEP/METPRO
	200 mV to 2 V	0.4 $\mu$ V + 3.5 $\mu$ V/V	
	2 V to 20 V	4 $\mu$ V + 3.5 $\mu$ V/V	
	20 V to 200 V	40 $\mu$ V + 5.5 $\mu$ V/V	
	200 V to 1 000 V	500 $\mu$ V + 5.5 $\mu$ V/V	
Equipment to Measure DC Current <sup>FO</sup>	0.06 $\mu$ A to 329.999 9 $\mu$ A	0.02 $\mu$ A + 0.15 mA/A	Fluke 5520A GIDEP/METPRO
	330 $\mu$ A to 3.299 99 mA	0.05 $\mu$ A + 0.1 mA/A	
	3.3 mA to 32.999 9 mA	0.25 $\mu$ A + 0.1 mA/A	
	33 mA to 329.999 mA	2.5 $\mu$ A + 0.1 mA/A	
	330 A 1.099 99 A	40 $\mu$ A + 0.2 mA/A	
	1.1 A to 2.999 99 A	40 $\mu$ A + 0.38 mA/A	
	3 A to 10.999 9 A	500 $\mu$ A + 0.5 mA/A	
	11 A to 20.5 A	750 $\mu$ A + 1 mA/A	
Equipment to Output DC Current <sup>FO</sup>	1.25 nA to 200 $\mu$ A	0.4 nA + 12 $\mu$ A/A	Fluke 8508A GIDEP/METPRO
	200 $\mu$ A to 2 mA	4 nA + 12 $\mu$ A/A	
	2 mA to 20 mA	40 nA + 14 $\mu$ A/A	
	20 mA to 200 mA	8 $\mu$ A + 48 $\mu$ A/A	
	20 mA to 2 A	16 $\mu$ A + 185 $\mu$ A/A	
	2 A to 20 A	400 $\mu$ A + 0.4 mA/A	
Equipment to Measure AC Voltage at the Listed Frequencies <sup>FO</sup>			Fluke 5520A GIDEP/METPRO
10 Hz to 45 Hz	1.0 mV to 32.999 mV	6 $\mu$ V + 0.8 mV/V	
45 Hz to 10 kHz	1.0 mV to 32.999 mV	6 $\mu$ V + 0.15 mV/V	
10 kHz to 20 kHz	1.0 mV to 32.999 mV	6 $\mu$ V + 0.2 mV/V	
20 kHz to 50 kHz	1.0 mV to 32.999 mV	6 $\mu$ V + 1 mV/V	
50 kHz to 100 kHz	1.0 mV to 32.999 mV	12 $\mu$ V + 3.5 mV/V	
100 kHz to 500 kHz	1.0 mV to 32.999 mV	50 $\mu$ V + 8 mV/V	
Equipment to Measure AC Voltage at the Listed Frequencies <sup>FO</sup>			
10 Hz to 45 Hz	33 mV to 329.999 mV	8 $\mu$ V + 0.3 mV/V	
45 Hz to 10 kHz	33 mV to 329.999 mV	8 $\mu$ V + 0.15 mV/V	
10 kHz to 20 kHz	33 mV to 329.999 mV	8 $\mu$ V + 0.16 mV/V	
20 kHz to 50 kHz	33 mV to 329.999 mV	8 $\mu$ V + 0.35 mV/V	
50 kHz to 100 kHz	33 mV to 329.999 mV	32 $\mu$ V + 0.8 mV/V	
100 kHz to 500 kHz	33 mV to 329.999 mV	70 $\mu$ V + 2 mV/V	



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Equipment to Measure AC Voltage at the Listed Frequencies <sup>FO</sup>			Fluke 5520A GIDEP/METPRO
10 Hz to 45 Hz	0.33 V to 3.299 99 V	50 $\mu$ V + 0.3 mV/V	
45 Hz to 10 kHz	0.33 V to 3.299 99 V	60 $\mu$ V + 0.15 mV/V	
10 kHz to 20 kHz	0.33 V to 3.299 99 V	60 $\mu$ V + 0.19 mV/V	
20 kHz to 50 kHz	0.33 V to 3.299 99 V	50 $\mu$ V + 0.3 mV/V	
50 kHz to 100 kHz	0.33 V to 3.299 99 V	130 $\mu$ V + 0.7 mV/V	
100 kHz to 500 kHz	0.33 V to 3.299 99 V	600 $\mu$ V + 2.4 mV/V	
Equipment to Measure AC Voltage at the Listed Frequencies <sup>FO</sup>			
10 Hz to 45 Hz	3.3 V to 32.999 9 V	650 $\mu$ V + 0.3 mV/V	
45 Hz to 10 kHz	3.3 V to 32.999 9 V	600 $\mu$ V + 1.5 mV/V	
10 kHz to 20 kHz	3.3 V to 32.999 9 V	600 $\mu$ V + 0.24 mV/V	
20 kHz to 50 kHz	3.3 V to 32.999 9 V	600 $\mu$ V + 0.35 mV/V	
50 kHz to 100 kHz	3.3 V to 32.999 9 V	1.6 mV + 0.9 mV/V	
Equipment to Measure AC Voltage at the Listed Frequencies <sup>FO</sup>			
10 Hz to 45 Hz	33 V to 329.999 V	2 mV + 0.19 mV/V	
45 Hz to 10 kHz	33 V to 329.999 V	6 mV + 0.2 mV/V	
10 kHz to 20 kHz	33 V to 329.999 V	6 mV + 0.25 mV/V	
20 kHz to 50 kHz	33 V to 329.999 V	6 mV + 0.3 mV/V	
50 kHz to 100 kHz	33 V to 329.999 V	50 mV + 2 mV/V	
Equipment to Measure AC Voltage at the Listed Frequencies <sup>FO</sup>			
45 Hz to 1 kHz	330 V to 1 020 V	10 mV + 0.3 mV/V	
1 kHz to 5 kHz	330 V to 1 020 V	10 mV + 0.25 mV/V	
5 kHz to 10 kHz	330 V to 1 020 V	10 mV + 0.3 mV/V	
Equipment to Output AC Voltage at the Listed Frequencies <sup>FO</sup>			Fluke 8508A GIDEP/METPRO
1 Hz to 10 Hz	42.1 $\mu$ V to 200 mV	14 $\mu$ V + 0.17 mV/V	
10 Hz to 40 Hz	12 $\mu$ V to 200 mV	4 $\mu$ V + 0.14 mV/V	
40 Hz to 100 Hz	12 $\mu$ V to 200 mV	4 $\mu$ V + 0.12 mV/V	
100 Hz to 2 kHz	6 $\mu$ V to 200 mV	2 $\mu$ V + 0.11 mV/V	
2 kHz to 10 kHz	12 $\mu$ V to 200 mV	4 $\mu$ V + 0.14 mV/V	
10 kHz to 30 kHz	24 $\mu$ V to 200 mV	8 $\mu$ V + 0.34 mV/V	
30 kHz to 100 kHz	60 $\mu$ V to 200 mV	20 $\mu$ V + 0.77 mV/V	



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Equipment to Output AC Voltage at the Listed Frequencies <sup>F0</sup>			Fluke 5520A GIDEP/METPRO
1 Hz to 10 Hz	200 mV to 2 V	120 $\mu$ V + 0.15 mV/V	
10 Hz to 40 Hz	200 mV to 2 V	20 $\mu$ V + 0.12 mV/V	
40 Hz to 100 Hz	200 mV to 2 V	20 $\mu$ V + 0.09 mV/V	
100 Hz to 2 kHz	200 mV to 2 V	20 $\mu$ V + 0.08 mV/V	
2 kHz to 10 kHz	200 mV to 2 V	20 $\mu$ V + 0.11 mV/V	
10 kHz to 30 kHz	200 mV to 2 V	40 $\mu$ V + 0.22 mV/V	
30 kHz to 100 kHz	200 mV to 2 V	200 $\mu$ V + 0.57 mV/V	
100 kHz to 300 kHz	200 mV to 2 V	2 mV + 3 mV/V	
300 kHz to 1 MHz	200 mV to 2 V	20 mV + 0.057 mV/V	
Equipment to Output AC Voltage at the Listed Frequencies <sup>F0</sup>			Fluke 8508A GIDEP/METPRO
1 Hz to 10 Hz	2 V to 20 V	1.2 mV + 0.15 mV/V	
10 Hz to 40 Hz	2 V to 20 V	200 $\mu$ V + 0.115 mV/V	
40 Hz to 100 Hz	2 V to 20 V	200 $\mu$ V + 0.09 mV/V	
100 Hz to 2 kHz	2 V to 20 V	200 $\mu$ V + 0.075 mV/V	
2 kHz to 10 kHz	2 V to 20 V	200 $\mu$ V + 0.11 mV/V	
10 kHz to 30 kHz	2 V to 20 V	400 $\mu$ V + 0.22 mV/V	
30 kHz to 100 kHz	2 V to 20 V	2 mV + 0.57 mV/V	
Equipment to Output AC Voltage at the Listed Frequencies <sup>F0</sup>			Fluke 8508A GIDEP/METPRO
100 kHz to 300 kHz	2 V to 20 V	20 mV + 3 mV/V	
300 kHz to 1 MHz	2 V to 20 V	200 mV + 20 mV/V	
Equipment to Output AC Voltage at the Listed Frequencies <sup>F0</sup>			
1 Hz to 10 Hz	200 V to 1 000 V	70 mV + 0.15 mV/V	
10 Hz to 40 Hz	200 V to 1 000 V	20 mV + 0.12 mV/V	
40 Hz to 100 Hz	200 V to 1 000 V	20 mV + 0.115 mV/V	
10 kHz to 30 kHz	200 V to 1 000 V	40 mV + 0.225 mV/V	
30 kHz to 100 kHz	200 V to 1 000 V	200 mV + 0.58 mV/V	



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Equipment to Measure AC Current at the Listed Frequencies <sup>FO</sup>			Fluke 5520A GIDEP/METPRO
10 Hz to 20 Hz	29 $\mu$ A to 329.99 $\mu$ A	0.1 $\mu$ A + 2 mA/A	
20 Hz to 45 Hz	29 $\mu$ A to 329.99 $\mu$ A	0.1 $\mu$ A + 1.5 mA/A	
45 Hz to 1 kHz	29 $\mu$ A to 329.99 $\mu$ A	0.1 $\mu$ A + 1.25 mA/A	
1 kHz to 5 kHz	29 $\mu$ A to 329.99 $\mu$ A	0.15 $\mu$ A + 3 mA/A	
5 kHz to 10 kHz	29 $\mu$ A to 329.99 $\mu$ A	0.2 $\mu$ A + 8 mA/A	
10 kHz to 30 kHz	29 $\mu$ A to 329.99 $\mu$ A	0.4 $\mu$ A + 16 mA/A	
Equipment to Measure AC Current at the Listed Frequencies <sup>FO</sup>			
10 Hz to 20 Hz	0.33 mA to 3.299 9 mA	0.15 $\mu$ A + 2 mA/A	
20 Hz to 45 Hz	0.33 mA to 3.299 9 mA	0.15 $\mu$ A + 1.25 mA/A	
45 Hz to 1 kHz	0.33 mA to 3.299 9 mA	0.15 $\mu$ A + 1 mA/A	
1 kHz to 5 kHz	0.33 mA to 3.299 9 mA	0.2 $\mu$ A + 2 mA/A	
5 kHz to 10 kHz	0.33 mA to 3.299 9 mA	0.3 $\mu$ A + 5 mA/A	
10 kHz to 30 kHz	0.33 mA to 3.299 9 mA	0.6 $\mu$ A + 10 mA/A	
Equipment to Measure AC Current at the Listed Frequencies <sup>FO</sup>			
10 Hz to 20 Hz	3.3 mA to 32.999 mA	2 $\mu$ A + 1.8 mA/A	
20 Hz to 45 Hz	3.3 mA to 32.999 mA	2 $\mu$ A + 0.9 mA/A	
45 Hz to 1 kHz	3.3 mA to 32.999 mA	2 $\mu$ A + 0.4 mA/A	
1 kHz to 5 kHz	3.3 mA to 32.999 mA	2 $\mu$ A + 0.8 mA/A	
5 kHz to 10 kHz	3.3 mA to 32.999 mA	3 $\mu$ A + 2 mA/A	
10 kHz to 30 kHz	3.3 mA to 32.999 mA	4 $\mu$ A + 4 mA/A	
Equipment to Measure AC Current at the Listed Frequencies <sup>FO</sup>			
10 Hz to 20 Hz	33 mA to 329.99 mA	20 $\mu$ A + 1.8 mA/A	
20 Hz to 45 Hz	33 mA to 329.99 mA	20 $\mu$ A + 0.9 mA/A	
45 Hz to 1 kHz	33 mA to 329.99 mA	20 $\mu$ A + 0.4 mA/A	
1 kHz to 5 kHz	33 mA to 329.99 mA	50 $\mu$ A + 1 mA/A	
5 kHz to 10 kHz	33 mA to 329.99 mA	100 $\mu$ A + 2 mA/A	
10 kHz to 30 kHz	33 mA to 329.99 mA	200 $\mu$ A + 4 mA/A	



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### Electrical

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Equipment to Measure AC Current at the Listed Frequencies <sup>FO</sup>			Fluke 5520A GIDEP/METPRO
10 Hz to 45 Hz	0.33 A to 1.099 99 A	100 $\mu$ A + 1.8 mA/A	
45 Hz to 1 kHz	0.33 A to 1.099 99 A	100 $\mu$ A + 0.5 mA/A	
1 kHz to 5 kHz	0.33 A to 1.099 99 A	1 mA + 6 mA/A	
5 kHz to 10 kHz	0.33 A to 1.099 99 A	5 mA + 25 mA/A	
Equipment to Measure AC Current at the Listed Frequencies <sup>FO</sup>			
10 Hz to 45 Hz	1.1 A to 2.999 99 A	100 $\mu$ A + 1.8 mA/A	
45 Hz to 1 kHz	1.1 A to 2.999 99 A	100 $\mu$ A + 0.6 mA/A	
1 kHz to 5 kHz	1.1 A to 2.999 99 A	1 mA + 6 mA/A	
5 kHz to 10 kHz	1.1 A to 2.999 99 A	5 mA + 25 mA/A	
Equipment to Measure AC Current at the Listed Frequencies <sup>FO</sup>			
45 Hz to 100 Hz	3 A to 10.999 99A	2 mA + 0.6 mA/A	
100 Hz to 1 kHz	3 A to 10.999 99A	2 mA + 1 mA/A	
1 kHz to 5 kHz	3 A to 10.999 99A	2 mA + 30 mA/A	
Equipment to Measure AC Current at the Listed Frequencies <sup>FO</sup>			
45 Hz to 100 Hz	11 A to 20.5 A	5 mA + 1.2 mA/A	
100 Hz to 1 kHz	11 A to 20.5 A	5 mA + 1.5 mA/A	
1 kHz to 5 kHz	11 A to 20.5 A	5 mA + 31 mA/A	
Equipment to Output AC Current at the Listed Frequencies <sup>FO</sup>			Fluke 8508A GIDEP/METPRO
1 Hz to 10 Hz	12 $\mu$ A to 200 $\mu$ A	0.02 $\mu$ A + 0.5 mA/A	
10 Hz to 10 kHz	12 $\mu$ A to 200 $\mu$ A	0.02 $\mu$ A + 0.5 mA/A	
10 kHz to 30 kHz	12 $\mu$ A to 200 $\mu$ A	0.02 $\mu$ A + 0.71 mA/A	
30 kHz to 100 kHz	12 $\mu$ A to 200 $\mu$ A	0.02 $\mu$ A + 4 mA/A	
Equipment to Output AC Current at the Listed Frequencies <sup>FO</sup>			
1 Hz to 10 Hz	200 $\mu$ A to 2 mA	0.2 $\mu$ A + 0.31mA/A	
10 Hz to 10 kHz	200 $\mu$ A to 2 mA	0.2 $\mu$ A + 0.3 mA/A	
10 kHz to 30 kHz	200 $\mu$ A to 2 mA	0.2 $\mu$ A + 0.71 mA/A	
30 kHz to 100 kHz	200 $\mu$ A to 2 mA	0.2 $\mu$ A + 4 mA/A	



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Equipment to Output AC Current at the Listed Frequencies <sup>FO</sup>			Fluke 8508A GIDEP/METPRO
1 Hz to 10 Hz	2 mA to 20 mA	2 $\mu$ A + 0.31mA/A	
10 Hz to 10 kHz	2 mA to 20 mA	2 $\mu$ A + 0.3 mA/A	
10 kHz to 30 kHz	2 mA to 20 mA	2 $\mu$ A + 0.71 mA/A	
30 kHz to 100 kHz	2 mA to 20 mA	2 $\mu$ A + 4 mA/A	
Equipment to Output AC Current at the Listed Frequencies <sup>FO</sup>			
1 Hz to 10 Hz	20 mA to 200 mA	20 $\mu$ A + 0.31 mA/A	
10 Hz to 10 kHz	20 mA to 200 mA	20 $\mu$ A + 0.29 mA/A	
10 kHz to 30 kHz	20 mA to 200 mA	20 $\mu$ A + 0.625 mA/A	
Equipment to Output AC Current at the Listed Frequencies <sup>FO</sup>			
10 Hz to 2 kHz	200 mA to 2 A	0.2 mA + 0.62 mA/A	
2 kHz to 10 kHz	200 mA to 2 A	0.2 mA + 0.735 mA/A	
10 kHz to 30 kHz	200 mA to 2 A	0.2 mA + 3 mA/A	
Equipment to Output AC Current at the Listed Frequencies <sup>FO</sup>			
10 Hz to 2 kHz	2 A to 20 A	2 mA + 0.82 mA/A	
2 kHz to 10 kHz	2 A to 20 A	2 mA + 2.5 mA/A	
Equipment to Measure Resistance <sup>FO</sup>			Fluke 5520A GIDEP/METPRO
3 m $\Omega$ to 10.999 9 $\Omega$		1 m $\Omega$ + 40 $\mu\Omega/\Omega$	
11 $\Omega$ to 32.999 9 $\Omega$		1.5 m $\Omega$ + 30 $\mu\Omega/\Omega$	
33 $\Omega$ to 109.999 9 $\Omega$		1.4 m $\Omega$ + 28 $\mu\Omega/\Omega$	
110 $\Omega$ to 329.999 9 $\Omega$		2 m $\Omega$ + 28 $\mu\Omega/\Omega$	
330 $\Omega$ to 1.099 999 k $\Omega$		2 m $\Omega$ + 28 $\mu\Omega/\Omega$	
1.1 k $\Omega$ to 3.2999 999 k $\Omega$		20 m $\Omega$ + 28 $\mu\Omega/\Omega$	
3.3 k $\Omega$ to 10.999 99 k $\Omega$		20 m $\Omega$ + 28 $\mu\Omega/\Omega$	
11 k $\Omega$ to 32.999 99 k $\Omega$		0.2 $\Omega$ + 28 $\mu\Omega/\Omega$	
33 k $\Omega$ to 109.999 9 k $\Omega$		0.2 $\Omega$ + 28 $\mu\Omega/\Omega$	
110 k $\Omega$ to 329.999 9 k $\Omega$		2 $\Omega$ + 32 $\mu\Omega/\Omega$	
330 k $\Omega$ to 1.099 99 k $\Omega$		2 $\Omega$ + 32 $\mu\Omega/\Omega$	
1.1 M $\Omega$ to 3.299 999 M $\Omega$		30 $\Omega$ + 60 $\mu\Omega/\Omega$	
3.3 M $\Omega$ to 10.999 99 M $\Omega$		50 $\Omega$ + 0.13 m $\Omega/\Omega$	
11 M $\Omega$ to 32.999 99 M $\Omega$		2.5 k $\Omega$ + 0.25 m $\Omega/\Omega$	



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Equipment to Measure Resistance <sup>FO</sup>	33 M $\Omega$ to 109.999 9 M $\Omega$	3 k $\Omega$ + 0.5 m $\Omega$ / $\Omega$	Fluke 5520A GIDEP/METPRO
	110 M $\Omega$ to 329.999 9 M $\Omega$	100 k $\Omega$ + 3 m $\Omega$ / $\Omega$	
	330 M $\Omega$ to 1 110 M $\Omega$	500 k $\Omega$ + 15 m $\Omega$ / $\Omega$	
Equipment to Output Resistance <sup>FO</sup>	12 $\mu\Omega$ to 2 $\Omega$	4 $\mu\Omega$ + 17 $\mu\Omega$ / $\Omega$	Fluke 8508A GIDEP/ METPRO
	2 $\Omega$ to 20 $\Omega$	14 $\mu\Omega$ + 9.5 $\mu\Omega$ / $\Omega$	
	20 $\Omega$ to 2 k $\Omega$	0.5 m $\Omega$ + 8 $\mu\Omega$ / $\Omega$	
	2 k $\Omega$ to 20 k $\Omega$	5 m $\Omega$ + 8 $\mu\Omega$ / $\Omega$	
	20 k $\Omega$ to 200 k $\Omega$	50 m $\Omega$ + 8 $\mu\Omega$ / $\Omega$	
	200 k $\Omega$ to 2 M $\Omega$	1 $\Omega$ + 9 $\mu\Omega$ / $\Omega$	
	2 M $\Omega$ to 20 M $\Omega$	100 $\Omega$ + 20 $\mu\Omega$ / $\Omega$	
	20 M $\Omega$ to 200 M $\Omega$	10 k $\Omega$ + 120 $\mu\Omega$ / $\Omega$	
Equipment to Measure Capacitance At the listed frequencies 10 Hz to 10 kHz <sup>FO</sup>	0.19 nF to 0.399 9 nF	0.01 nF + 5 mF/F	Fluke 5520A GIDEP/METPRO
	0.4 nF to 1.099 9 nF	0.01 nF + 5 mF/F	
Equipment to Measure Capacitance At the listed frequencies 10 Hz to 3 kHz <sup>FO</sup>	0.11 nF to 3.299 9 nF	0.01 nF + 5 mF/F	
Equipment to Measure Capacitance At the listed frequencies 10 Hz to 1kHz <sup>FO</sup>	3.3 nF to 10.999 9 nF	0.01 nF + 2.5 mF/F	
	11 nF to 32.999 9 nF	0.01 nF + 2.5 mF/F	
	33 nF to 109.999 nF	0.01 nF + 2.5 mF/F	
	110 nF to 329.999 nF	0.3 nF + 2.5 mF/F	
Equipment to Measure Capacitance At the listed frequencies 10 Hz to 600 Hz <sup>FO</sup>	0.33 $\mu$ F to 1.099 99 $\mu$ F	1 nF + 2.5 mF/F	
Equipment to Measure Capacitance At the listed frequencies 10 Hz to 300 Hz <sup>FO</sup>	1.1 $\mu$ F to 3.29 999 $\mu$ F	3 nF + 2.5 mF/F	
Equipment to Measure Capacitance At the listed frequencies 10 Hz to 150 Hz <sup>FO</sup>	3.3 $\mu$ F to 10.999 9 $\mu$ F	10 nF + 2.5 mF/F	



# Certificate of Accreditation: Supplement

## American Valley Avionics and Calibration

137 Industrial Loop South, Orange Park, FL 32073

Contact: Matt Raulerson Phone: 904-644-8105

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

### 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 Capacitance At the listed frequencies 10 Hz to 120 Hz <sup>FO</sup>	11 $\mu$ F to 32.999 9 $\mu$ F	30 nF + 4 mF/F	Fluke 5520A GIDEP/METPRO
Equipment to Measure Capacitance At the listed frequencies 10 Hz to 80 Hz <sup>FO</sup>	33 $\mu$ F to 109.999 $\mu$ F	100 nF + 4.5 mF/F	
Equipment to Measure Capacitance At the listed frequencies 0 Hz to 50 Hz <sup>FO</sup>	110 $\mu$ F to 329.999 $\mu$ F	300 nF + 4.5 mF/F	
Equipment to Measure Capacitance At the listed frequencies 0 Hz to 20 Hz <sup>FO</sup>	0.33 mF to 1.099 99 mF	1 $\mu$ F + 4.5 mF/F	
Equipment to Measure Capacitance At the listed frequencies 0 Hz to 6 Hz <sup>FO</sup>	1.1 mF to 3.299 9 mF	3 $\mu$ F + 4.5 mF/F	
Equipment to Measure Capacitance At the listed frequencies 0 Hz to 2 Hz <sup>FO</sup>	3.3 mF to 10.999 9 mF	10 $\mu$ F + 4.5 mF/F	
Equipment to Measure Capacitance At the listed frequencies 0 Hz to 0.6 Hz <sup>FO</sup>	11 mF to 32.999 9 mF	30 $\mu$ F + 7.5 mF/F	
Equipment to Measure Capacitance At the listed frequencies 0 Hz to 0.2 Hz <sup>FO</sup>	33 mF to 110 mF	100 $\mu$ F + 11 mF/F	
Equipment to Measure Power At the listed frequencies 10 Hz to 20 kHz <sup>FO</sup>	100 mW to 250 mW	12 mW/W	Fluke 9640A GIDEP/METPRO
	25 mW to 100 mW	12 mW/W	
	20 $\mu$ W to 25 mW	12 mW/W	
	16 nW to 20 $\mu$ W	12 mW/W	
Equipment to Measure Power At the listed frequencies 20 kHz to 100 kHz <sup>FO</sup>	100 mW to 250 mW	12 mW/W	
	25 mW to 100 mW	12 mW/W	
	20 $\mu$ W to 25 mW	12 mW/W	
	16 nW to 20 $\mu$ W	12 mW/W	



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### Electrical

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Equipment to Measure Power At the listed frequencies 100 kHz to 10 MHz <sup>FO</sup>	100 mW to 250 mW	12 mW/W	Fluke 9640A GIDEP/METPRO
	25 mW to 100 mW	12 mW/W	
	20 uW to 25 mW	12 mW/W	
	16 nW to 20 uW	12 mW/W	
	40 pW to 16 nW	48 mW/W	
	4 pW to 40 pW	130 mW/W	
	0.4 pW to 4 pW	130 mW/W	
Equipment to Measure Power At the listed frequencies 10 MHz to 125 MHz <sup>FO</sup>	100 mW to 250 mW	12 mW/W	
	25 mW to 100 mW	12 mW/W	
	20 $\mu$ W to 25 mW	12 mW/W	
	16 nW to 20 $\mu$ W	12 mW/W	
	40 pW to 16 nW	48 mW/W	
Equipment to Measure Power At the listed frequencies 10 MHz to 125 MHz <sup>FO</sup>	4 pW to 40 pW	130 mW/W	
	0.4 pW to 4 pW	130 mW/W	
	1 pW to 0.4 pW	420 mW/W	
Equipment to Measure Power At the listed frequencies 10 MHz to 125 MHz <sup>FO</sup>	100 mW to 250 mW	12 mW/W	
	25 mW to 100 m	12 mW/W	
	20 $\mu$ W to 25 mW	12 mW/W	
	16 nW to 20 $\mu$ W	12 mW/W	
	40 pW to 16 nW	48 mW/W	
	4 pW to 40 pW	130 mW/W	
	0.4 pW to 4 pW	130 mW/W	
	1 fW to 0.4 pW	420 mW/W	
Equipment to Measure Power At the listed frequencies 125 MHz to 300 MHz <sup>FO</sup>	25 mW to 100 mW	24 mW/W	
	20 $\mu$ W to 25 mW	24 mW/W	
	16 nW to 20 uW	24 mW/W	
	40 pW to 16 nW	48 mW/W	
	4 pW to 40 pW	130 mW/W	
	0.4 pW to 4 pW	130 mW/W	
	1 pW to 0.4 pW	420 mW/W	



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### 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 Power At the listed frequencies 300 MHz to 1.4 GHz <sup>FO</sup>	25 mW to 100 mW	60 mW/W	Fluke 9640A GIDEP/METPRO
	20 $\mu$ W to 25 mW	60 mW/W	
	16 nW to 20 $\mu$ W	130 mW/W	
	40 pW to 16 nW	130 mW/W	
	4 pW to 40 pW	260 mW/W	
	0.4 pW to 4 pW	260 mW/W	
	1 fW to 0.4 pW	420 mW/W	
Equipment to Measure Power At the listed frequencies 1.4 GHz to 3 GHz <sup>FO</sup>	20 $\mu$ W to 25 mW	72 mW/W	
	16 nW to 20 $\mu$ W	130 mW/W	
	4 pW to 40 pW	260 mW/W	
	0.4 pW to 4 pW	260 mW/W	
	1 pW to 0.4 pW	420 mW/W	
Equipment to Measure Power At the listed frequencies 3 GHz to 4 GHz <sup>FO</sup>	20 $\mu$ W to 25 mW	130 mW/W	
	16 nW to 20 $\mu$ W	130 mW/W	
	40 pW to 16 nW	130 mW/W	
	4 pW to 40 pW	260 mW/W	
Equipment to Output Power At the listed frequencies 9 kHz to 6 GHz <sup>FO</sup>	1 nW to 100 mW	3 % of reading	Agilent U2004A GIDEP/METPRO
Equipment to Output Power At the listed frequencies 100 kHz to 2.6 GHz <sup>FO</sup>	10 $\mu$ W to 1 W	13 mW/W	Hewlett Packard 8901B with 11722A GIDEP/METPRO
Temperature Calibration, Indication and Control Equipment used with Thermocouple Type B <sup>FO</sup>	600 °C to 800 °C	0.44 °C	Electrical Simulation of Thermocouple Output Fluke 5520A GIDEP/METPRO
	800 °C to 1 000 °C	0.34 °C	
	1 000 °C to 1 550 °C	0.3 °C	
	1 550 °C to 1 820 °C	0.33 °C	
Temperature Calibration, Indication and Control Equipment used with Thermocouple Type C <sup>FO</sup>	0 °C to 150 °C	0.3 °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	0.5 °C	
	1 800 °C to 2 316 °C	0.84 °C	



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### 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 Thermocouple Type E <sup>FO</sup>	-250 °C to -100 °C	0.5 °C	Electrical Simulation of Thermocouple Output Fluke 5520A GIDEP/METPRO
	-100 °C to -25 °C	0.16 °C	
	-25 °C to 350 °C	0.14 °C	
	350 °C to 650 °C	0.17 °C	
	650 °C to 1 000 °C	0.24 °C	
Temperature Calibration, Indication and Control Equipment used with Thermocouple Type J <sup>FO</sup>	-210 °C to -100 °C	0.27 °C	
	-100 °C to -25 °C	0.16 °C	
	-30 °C to 150 °C	0.14 °C	
	150 °C to 760 °C	0.18 °C	
	760 °C to 1 200 °C	0.24 °C	
Temperature Calibration, Indication and Control Equipment used with Thermocouple Type K <sup>FO</sup>	-200 °C to -100 °C	0.33 °C	
	-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	0.4 °C	
Temperature Calibration, Indication and Control Equipment used with Thermocouple Type N <sup>FO</sup>	-200 °C to -100 °C	0.4 °C	
	-100 °C to -25 °C	0.22 °C	
	-125 °C to 120 °C	0.19 °C	
	120 °C to 410 °C	0.18 °C	
	410 °C to 1 300 °C	0.27 °C	
Temperature Calibration, Indication and Control Equipment used with Thermocouple Type R <sup>FO</sup>	0 °C to 250 °C	0.57 °C	
	250 °C to 400 °C	0.35 °C	
	400 °C to 1 000 °C	0.33 °C	
	1 000 °C to 1 767 °C	0.4 °C	
Temperature Calibration, Indication and Control Equipment used with Thermocouple Type T <sup>FO</sup>	-250 °C to -15 °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	



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## American Valley Avionics and Calibration

137 Industrial Loop South, Orange Park, FL 32073  
 Contact: Matt Raulerson Phone: 904-644-8105

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

### 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
Mass ANSI/ASTM Class 7 <sup>FO</sup>	0.05 g to 61 g	0.000 5 g	Denver TL-64 AVA-08
	61 g to 4 100 g	0.05 g	Ohaus E1D120 AVA-08
	4.1 kg to 15 kg	0.49 g	Fairbanks 70-6115 AVA-08
Force-Tension & Compression, Forces Gages and Load Cell Based Devices <sup>FO</sup>	2 N to 445 N	0.4 N	Omega LC101-100 with DPM-3 AVA-FG01
	445 N to 2 225 N	1.4 N	Omega LC101-500 with DPM-3 AVA-FG01
	2 225 N to 9 000 N	4.9 N	Omega LC101-2K with DPM-3 AVA-FG01
	9 000 N to 45 000 N	22 N	Omega LC101-10K with DPM-3 AVA-FG01
	45 000 N to 177 000 N	280 N	Omega LC101-40K with DPM-3 AVA-FG01
Force-Compression <sup>FO</sup>	44 500 N to 450 000 N	270 N	OmegaDyne LC1102-100K with Transducer Techniques DPM-3 AVA-FG01

### 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
Torque Wrenches <sup>FO</sup>	45.2 N•cm to 226 N•cm	0.59 % of reading	Mountz S 320 AVA-TW01
	3.40 N•m to 16.9 N•m	0.77 % of reading	AWS 3015 AVA-FG01
	3.00 N•m to 28.25 N•m	0.73 % of reading	CDI 2502-I-DDT AVA-TW01
	34.0 N•m to 340 N•m	0.65 % of reading	Armstrong 64-646 AVA-TW01
	160 N•m to 813 N•m	1 % of reading	Transducer Techniques SWS-1k with Transducer Techniques DPM-3 AVA-TW01
	150 N•m to 1 500 N•m	4.1 N•m	
Torque Analyzer <sup>FO</sup>	6.77 N•m to 339 N•m	0.065 % of Applied Load	TTP250with Class F weights
Equipment to Measure Pressure <sup>FO</sup>	5 kPa to 7 MPa (abs)	(10 + 3.7 x 10 <sup>-5</sup> P) Pa	DHI PG7601 AVA-PG01
	160 kPa to 52 000 kPa (rel. to atm)	52 kPa	Ashcroft ATE-100/AQS-2 AVA-PG01
	52 000 kPa to 280 000 kPa (rel. to atm)	(62 + 5.7 x 10 <sup>-3</sup> P) kPa	Ruska 2451 625-M100 AVA-PG01



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## American Valley Avionics and Calibration

137 Industrial Loop South, Orange Park, FL 32073

Contact: Matt Raulerson Phone: 904-644-8105

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

### 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 Temperature Thermistors <sup>FO</sup>	-45 °C to 140 °C	0.034 °C	Hart Scientific 9170, Hart Scientific 5616-12, and Fluke 8508A
RTDs <sup>FO</sup>	-45 °C to 140 °C	0.1 °C	GIDEP/METPRO
	141 °C to 320 °C	0.59 °C	King Nutronics Drywell 3604, Hart Scientific 5616-12, and Fluke 8508A AVA-TI01
	321 °C to 650 °C	(0.11 + 0.001 5Te) °C	King Nutronics Drywell 3604-1-101 AVA-TI01
Thermocouples <sup>O</sup>	-45 °C to 140 °C	0.18 °C	Hart Scientific 9170, Hart Scientific 5616, and Fluke 8508A AVA-TI01
	141 °C to 320 °C	0.61 °C	King Nutronics Drywell 3604, Hart Scientific 5616-12, and Fluke 8508A AVA-TI01
	321 °C to 650 °C	(0.11 + 0.001 5Te) °C	King Nutronics Drywell 3604 AVA-TI01
Liquid in Glass Thermometers <sup>FO</sup>	-45 °C to 140 °C	0.31 °C	Hart Scientific 9170, Hart Scientific 5616, and Fluke 8508A AVA-25
	141 °C to 320 °C	0.97 °C	King Nutronics Drywell 3604, Hart Scientific 5616-12, and Fluke 8508A AVA-25
	321 °C to 650 °C	1.2 °C	King Nutronics Drywell 3604 AVA-25
IR Devices <sup>FO</sup>	50 °C to 121 °C	0.95 °C	Extech IRC350
	122 °C to 260 °C	1.4 °C	Hart Scientific 5616-12, and Fluke 8508A
	261 °C to 350 °C	2.1 °C	GIDEP
Equipment to Source Temperature Bath and Block Calibrators <sup>FO</sup>	-196 °C to 125 °C	0.18 °C	Hart Scientific 5616 with Fluke 8508A
	125 °C to 420 °C	0.28 °C	AVA-HSB1702



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## American Valley Avionics and Calibration

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

### 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
Equipment to Measure Frequency <sup>FO</sup>	10 MHz	64 $\mu$ Hz	GPS Time Standard-Hewlett Packard Z3801A NIST 960-12
	10 Hz to 4 GHz	160 $\mu$ Hz + 0.04 $\mu$ Hz/Hz	Fluke 9640A
	1 GHz to 20 GHz	3.7 $\mu$ Hz/Hz	Agilent 83731B-1E1 with Hewlett Packard Z3801A GIDEP/ METPRO

### 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
Equipment to Output Frequency <sup>FO</sup>	10 Hz to 20 GHz (Resolutions to 1 Hz)	2 $\mu$ Hz/Hz	Hewlett Packard 5350B with Hewlett Packard Z3801A GIDEP/ METPRO

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 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.
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<sup>FO</sup> 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.



## *Certificate of Accreditation: Supplement*

### **American Valley Avionics and Calibration**

137 Industrial Loop South, Orange Park, FL 32073

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*Accreditation is granted to the facility to perform the following calibration:*

6. The term L represents length in inches or millimeters appropriate to the uncertainty statement.
7. The term P represents pressure in Pascals or kPascals appropriate to the uncertainty statement.
8. The term T represents torque in Newton•meters.
9. The term F represents force in Newtons.
10. The term Te represents temperature in °C.

