



CERTIFICATE OF ACCREDITATION

ANSI-ASQ National Accreditation Board

500 Montgomery Street, Suite 625, Alexandria, VA 22314, 877-344-3044

This is to certify that

AppMet, Inc.
7308 Peppermill Parkway
North Charleston, SC 29418

has been assessed by ANAB
and meets the requirements of international standard

ISO/IEC 17025:2005

while demonstrating technical competence in the field of

CALIBRATION

Refer to the accompanying Scope of Accreditation for information regarding the types of calibrations to which this accreditation applies.

AC-1358
Certificate Number


ANAB Approval

Certificate Valid: 12/07/2017-12/06/2018
Version No. 010 Issued: 12/07/2017



This laboratory 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 (refer to joint ISO-ILAC-IAF Communiqué dated April 2017).



SCOPE OF ACCREDITATION TO ISO/IEC 17025:2005

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 North Charleston, SC 29418
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CALIBRATION

Valid to: **December 6, 2018**

Certificate Number: **AC-1358**

Electrical – DC/Low Frequency

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
DC Voltage - Source ¹	Up to 330 mV 330 mV to 3.3 V (3.3 to 33) V (33 to 330) V 330 V to 1 kV	20 μ V/V + 1.1 μ V 13 μ V/V + 1.6 μ V 12 μ V/V + 21 μ V 19 μ V/V + 0.14 mV 19 μ V/V + 1.5 mV	Fluke 5520A Multifunction Calibrator
AC Voltage - Source ¹	(1 to 33) mV (10 to 45) Hz 45 Hz to 10 kHz (10 to 20) kHz (20 to 50) kHz (50 to 100) kHz (100 to 500) kHz (33 to 330) mV (10 to 45) Hz 45 Hz to 10 kHz (10 to 20) kHz (20 to 50) kHz (50 to 100) kHz (100 to 500) kHz 330 mV to 3.3 V (10 to 45) Hz 45 Hz to 10 kHz (10 to 20) kHz (20 to 50) kHz (50 to 100) kHz (100 to 500) kHz	0.73 mV/V + 8.9 μ V 0.13 mV/V + 6.7 μ V 0.19 mV/V + 6.6 μ V 0.98 mV/V + 6.5 μ V 3.5 mV/V + 13 μ V 8 mV/V + 51 μ V 0.23 mV/V + 46 μ V 0.14 mV/V + 11 μ V 0.15 mV/V + 11 μ V 0.34 V/V + 11 μ V 0.81 V/V + 33 μ V 2 mV/V + 72 μ V 0.21 mV/V + 0.42 mV 0.14 mV/V + 83 μ V 0.19 mV/V + 67 μ V 0.28 mV/V + 67 μ V 0.68 mV/V + 0.17 mV 2.3 mV/V + 0.61 mV	



Electrical – DC/Low Frequency

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
AC Voltage - Source ¹	(3.3 to 33) V (10 to 45) Hz 45 Hz to 10 kHz (10 to 20) kHz (20 to 50) kHz (50 to 100) kHz (33 to 330) V 45 Hz to 1 kHz (1 to 10) kHz (10 to 20) kHz (20 to 50) kHz (50 to 100) kHz 330 V to 1.02 kV 45 Hz to 1 kHz (1 to 5) kHz (5 to 10) kHz	0.24 mV/V + 4.2 mV 0.15 mV/V + 0.81 mV 0.23 mV/V + 0.83 mV 0.34 mV/V + 0.89 mV 0.88 mV/V + 1.9 mV 0.18 mV/V + 10 mV 0.19 mV/V + 9.7 mV 0.24 mV/V + 8.9 mV 0.29 mV/V + 9.4 mV 2 mV/V + 59 mV 0.3 mV/V + 22 mV 0.3 mV/V + 13 mV 0.3 mV/V + 6.6 mV	Fluke 5520A Multifunction Calibrator
DC Current - Source ¹	Up to 330 μ A 330 μ A to 3.3 mA (3.3 to 33) mA (33 to 330) mA 330 mA to 1.1 A (1.1 to 3) A (3 to 11) A (11 to 20.5) A	1.2 μ A 31 μ A/A to 1.2 μ A 84 μ A/A + 1 μ A 91 μ A/A + 6.9 μ A 0.19 mA/A + 46 μ A 0.37 mA/A + 95 μ A 0.49 mA/A + 0.64 mA 0.95 mA/A + 1.6 mA	
AC Current - Source ¹	(29 to 330) μ A (10 to 20) Hz (20 to 45) Hz 45 Hz to 1 kHz (1 to 5) kHz (5 to 10) kHz 330 μ A to 3.3 mA (10 to 20) Hz (20 to 45) Hz 45 Hz to 1 kHz (1 to 5) kHz (5 to 10) kHz	4.1 mA/A + 40 nA 4.3 mA/A + 0.11 μ A 3.9 mA/A + 0.1 μ A 4.6 mA/A + 90 nA 8.5 mA/A + 0.18 μ A 2.2 mA/A + 0.69 μ A 1.1 mA/A + 0.93 μ A 0.8 mA/A + 1 μ A 1.8 mA/A + 0.9 μ A 4.9 mA/A + 0.69 μ A	



Electrical – DC/Low Frequency

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
AC Current - Source ¹	(3.3 to 33) mA		Fluke 5520A Multifunction Calibrator
	(10 to 20) Hz	1.7 mA/A + 4.1 μA	
	(20 to 45) Hz	0.8 mA/A + 4.7 μA	
	45 Hz to 1 kHz	0.33 mA/A + 4.1 μA	
	(1 to 5) kHz	0.73 mA/A + 3.8 μA	
	(5 to 10) kHz	2 mA/A + 4.1 μA	
	(33 to 330) mA		
	(10 to 20) Hz	1.7 mA/A + 29 μA	
	(20 to 45) Hz	0.86 mA/A + 36 μA	
	45 Hz to 1 kHz	0.38 mA/A + 26 μA	
	(1 to 5) kHz	1 mA/A + 52 μA	
	(5 to 10) kHz	2 mA/A + 0.1 mA	
	330 mA to 1.1 A		
	(10 to 45) Hz	1.7 mA/A + 0.13 mA	
	45 Hz to 1 kHz	0.49 mA/A + 0.12 mA	
	(1 to 5) kHz	6 mA/A + 1 mA	
(1.1 to 3) A			
(45 to 65) Hz	1.8 mA/A + 0.13 mA		
(65 to 500) Hz	0.6 mA/A + 0.1 mA		
500 Hz to 1 kHz	0.58 mA + 1.6 mA		
(3 to 11) A			
(45 to 100) Hz	0.59 mA/A + 2.3 mA		
100 Hz to 1 kHz	0.99 mA/A + 2.1 mA		
(11 to 20.5) A			
(45 to 100) Hz	1.2 mA/A + 6.2 mA		
100 Hz to 1 kHz	1.5 mA/A + 5.8 mA		
Resistance - Source ¹	Up to 11 Ω	0.1 mΩ/Ω + 1.4 mΩ	
	(11 to 33) Ω	32 μΩ/Ω + 1.5 mΩ	
	(33 to 110) Ω	29 μΩ/Ω + 1.4 mΩ	
	(110 to 330) Ω	27 μΩ/Ω + 2.2 mΩ	
	330 Ω to 1.1 kΩ	29 μΩ/Ω + 1.6 mΩ	
	(1.1 to 3.3) kΩ	30 μΩ/Ω + 26 mΩ	
	(3.3 to 11) kΩ	29 μΩ/Ω + 22 mΩ	
	(11 to 33) kΩ	30 μΩ/Ω + 0.18 Ω	
	(33 to 110) kΩ	30 μΩ/Ω + 0.17 Ω	
	(110 to 330) kΩ	30 μΩ/Ω + 2.1 Ω	
	330 kΩ to 1.1 MΩ	50 μΩ/Ω + 4.1 Ω	



Electrical – DC/Low Frequency

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Resistance - Source ¹	330 kΩ to 1.1 MΩ (1.1 to 3.3) MΩ (3.3 to 11) MΩ (11 to 33) MΩ (33 to 110) MΩ (110 to 330) MΩ	50 μΩ/Ω + 4.1 Ω 60 μΩ/Ω + 34 Ω 0.1 mΩ/Ω + 43 Ω 0.3 mΩ/Ω + 2.3 kΩ 0.5 mΩ/Ω + 3.7 kΩ 3.1 mΩ/Ω + 47 kΩ	Fluke 5520A Multifunction Calibrator
DC Voltage - Measure ¹	Up to 100 mV 100 mV to 1 V (1 to 10) V (10 to 100) V 100 V to 1 kV	8.7 μV/V + 0.33 μV 8 μV/V + 0.3 μV 8 μV/V + 0.56 μV 9.6 μV/V + 43 μV 9.4 μV/V + 0.76 μV	HP 3458A Precision Multimeter
Capacitance - Source ¹	190 pF to 3.3 nF (3.3 to 11) nF (11 to 110) nF (110 to 330) nF 330 nF to 1.1 μF (1.1 to 3.3) μF (3.3 to 11) μF (11 to 33) μF (33 to 110) μF (110 to 330) μF 330 μA to 1.1 mF (1.1 to 3.3) mF (3.3 to 11) mF (11 to 33) mF (33 to 110) mF	5 mF/F + 10 pF 3 mF/F + 9.4 pF 3 mF/F + 0.1 nF 2 mF/F + 0.35 nF 3 mF/F + 0.9 nF 2 mF/F + 3.4 nF 3 mF/F + 9 nF 5 mF/F + 0.5 nF 4.7 mF/F + 96 nF 4.6 mF/F + 0.3 nF 4.5 mF/F + 1.1 μF 4.5 mF/F + 3 μF 4.4 mF/F + 10 μF 7.6 mF/F + 30 μF 11 mF/F + 0.1 mF	Fluke 5520A Multifunction Calibrator
AC Voltage - Measure ¹	Up to 10 mV (1 to 40) Hz 40 Hz to 1 kHz (1 to 20) kHz (20 to 50) kHz (50 to 100) kHz (100 to 300) kHz	0.3 mV/V + 3 μV 0.2 mV/V + 1.1 μV 0.27 mV/V + 1.5 μV 0.9 mV/V + 2 μV 4.9 mV/V + 2 μV 40 mV/V + 4.8 μV	HP 3458A Precision Multimeter

Electrical – DC/Low Frequency

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
AC Voltage - Measure ¹	(10 to 100) mV		HP 3458A Precision Multimeter
	(1 to 40) Hz	61 μ V/V + 4.9 μ V	
	40 Hz to 1 kHz	62 μ V/V + 3.3 μ V	
	(1 to 20) kHz	0.13 mV/V + 3.3 μ V	
	(20 to 50) kHz	0.26 mV/V + 6.7 μ V	
	(50 to 100) kHz	0.77 mV/V + 5.3 μ V	
	(100 to 300) kHz	3 mV/V + 12 μ V	
	300 kHz to 1 MHz	9.8 mV/V + 23 μ V	
	(1 to 2) MHz	15 mV/V + 19 μ V	
	100 mV to 1 V		
	(1 to 40) Hz	69 μ V/V + 42 μ V	
	40 Hz to 1 kHz	67 μ V/V + 24 μ V	
	(1 to 20) kHz	0.14 mV/V + 24 μ V	
	(20 to 50) kHz	0.3 mV/V + 24 μ V	
	(50 to 100) kHz	0.8 mV/V + 24 μ V	
	(100 to 300) kHz	3 mV/V + 0.1 mV	
	300 kHz to 1 MHz	10 mV/V + 0.13 mV	
	(1 to 2) MHz	15 mV/V + 0.1 mV	
	(1 to 10) V		
	(1 to 40) Hz	0.2 mV/V + 0.46 mV	
	40 Hz to 1 kHz	96 μ V/V + 0.24 mV	
	(1 to 20) kHz	96 μ V/V + 0.24 mV	
	(20 to 50) kHz	0.29 mV/V + 0.26 mV	
	(50 to 100) kHz	0.8 mV/V + 0.2 mV	
	(100 to 300) kHz	3 mV/V + 1 mV	
	300 kHz to 1 MHz	10 mV/V + 1.4 mV	
	(1 to 2) MHz	15 mV/V + 1 mV	
	(10 to 100) V		
	(1 to 40) Hz	0.2 mV/V + 4.3 mV	
	40 Hz to 1 kHz	0.2 mV/V + 2.4 mV	
(1 to 20) kHz	0.19 mV/V + 2.5 mV		
(20 to 50) kHz	0.34 mV/V + 2.6 mV		
(50 to 100) kHz	1.2 mV/V + 2 mV		
(100 to 300) kHz	4 mV/V + 10 mV		
300 kHz to 1 MHz	15 mV/V + 11 mV		
100 V to 1 kV			
(1 to 40) Hz	0.4 mV/V + 41 mV		
40 Hz to 1 kHz	0.4 mV/V + 22 mV		
(1 to 20) kHz	0.6 mV/V + 22 mV		
(20 to 50) kHz	1.2 mV/V + 23 mV		
(50 to 100) kHz	3 mV/V + 22 mV		



Electrical – DC/Low Frequency

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
DC Current - Measure ¹	100 nA to 1 μ A (1 to 10) μ A (10 to 100) μ A 100 μ A to 1 mA (1 to 10) mA (10 to 100) mA 100 mA to 1 A	30 μ A/A + 41 nA 20 μ A/A + 0.12 nA 20 μ A/A + 0.8 nA 20 μ A/A + 5 nA 20 μ A/A + 51 nA 35 μ A/A + 0.5 μ A 0.11 mA/A + 10 μ A	HP 3458A Precision Multimeter
AC Current - Measure ¹	Up to 100 μ A (10 to 20) Hz (20 to 45) Hz (45 to 100) Hz 100 Hz to 1 kHz 100 μ A to 1 mA (10 to 20) Hz (20 to 45) Hz (45 to 100) Hz 100 Hz to 5 kHz (5 to 20) kHz (20 to 50) kHz (50 to 100) kHz (1 to 10) mA (10 to 20) Hz (20 to 45) Hz (45 to 100) Hz 100 Hz to 5 kHz (5 to 20) kHz (20 to 50) kHz (50 to 100) kHz (10 to 100) mA (10 to 20) Hz (20 to 45) Hz (45 to 100) Hz 100 Hz to 5 kHz (5 to 20) kHz (20 to 50) kHz (50 to 100) kHz	4 mA/A + 0.3 μ A 1.5 mA/A + 0.3 μ A 0.6 mA/A + 0.3 μ A 0.6 mA/A + 0.3 μ A 4.1 mA/A + 0.2 μ A 1.5 mA/A + 0.21 μ A 0.59 mA/A + 0.22 μ A 0.59 mA/A + 0.22 μ A 0.59 mA/A + 0.22 μ A 4 mA/A + 0.4 μ A 5.4 mA/A + 1.6 μ A 4 mA/A + 2.1 μ A 1.5 mA/A + 2.1 μ A 0.59 mA/A + 2.1 μ A 0.59 mA/A + 2.1 μ A 0.59 mA/A + 2.1 μ A 4 mA/A + 4 μ A 5.4 mA/A + 16 μ A 4.2 mA/A + 3.3 μ A 1.2 mA/A + 49 μ A 0.59 mA/A + 22 μ A 0.60 mA/A + 21 μ A 0.59 mA/A + 22 μ A 4 mA/A + 41 μ A 5.5 mA/A + 0.15 mA	



Electrical – DC/Low Frequency

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
AC Current - Measure ¹	100 mA to 1 A (10 to 20) Hz (20 to 45) Hz (45 to 100) Hz 100 Hz to 5 kHz (5 to 20) kHz (20 to 50) kHz	9 mA/A + 0.2 mA 1.6 mA/A + 0.21 mA 0.78 mA/A + 0.22 mA 1 mA/A + 0.22 mA 3 mA/A + 0.21 mA 10 mA/A + 0.4 mA	HP 3458A Precision Multimeter
Resistance - Measure ¹	10 Ω 100 Ω 1 kΩ 10 kΩ 100 kΩ 1 MΩ 10 MΩ 100 MΩ 1 GΩ	15 μΩ/Ω + 5 μΩ 12 μΩ/Ω + 0.5 mΩ 9.9 μΩ/Ω + 1.3 mΩ 11 μΩ/Ω + 5.7 mΩ 10 μΩ/Ω + 46 mΩ 20 μΩ/Ω + 2 Ω 50 μΩ/Ω + 0.12 kΩ 0.5 mΩ/Ω + 3.8 kΩ 5 mΩ/Ω + 50 kΩ	
Electrical Simulation of Thermocouple Instruments ¹	Type E (-250 to -100) °C (-100 to -25) °C (-25 to 350) °C (350 to 650) °C (650 to 1 000) °C Type J (-210 to -100) °C (-100 to -30) °C (-30 to 150) °C (150 to 760) °C (760 to 1 200) °C Type K (-200 to -100) °C (-100 to -25) °C (-25 to 120) °C (120 to 1 000) °C (1 000 to 1 372) °C Type R (0 to 250) °C (250 to 400) °C (400 to 1 000) °C (1 000 to 1 767) °C	0.51 °C 0.18 °C 0.18 °C 0.22 °C 0.3 °C 0.28 °C 0.18 °C 0.16 °C 0.23 °C 0.34 °C 0.34 °C 0.2 °C 0.18 °C 0.34 °C 0.51 °C 0.58 °C 0.36 °C 0.34 °C 0.53 °C	Fluke 5520A Multifunction Calibrator



Electrical – DC/Low Frequency

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Electrical Simulation of Thermocouple Instruments ¹	Type S (0 to 250) °C (250 to 1 000) °C (1 000 to 1 400) °C (1 400 to 1 767) °C	0.48 °C 0.37 °C 0.38 °C 0.47 °C	Fluke 5520A Multifunction Calibrator
	Type T (-250 to -150) °C (-150 to 0) °C (0 to 120) °C (120 to 400) °C	0.64 °C 0.26 °C 0.18 °C 0.18 °C	
Welding Power Supply ¹ Voltage Current	(0 to 50) V (0 to 500) A	0.02 V 4.4 A	Cannon Load Bank and DMM

Length – Dimensional metrology

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Micrometers ¹ Outside Inside	Up to 12 in (1.5 to 12) in	(61 + 11L) μin (130 + 4.5L) μin	Gage Blocks
Calipers ¹	Up to 40 in	(530 + 7.5L) μin	Gage Blocks
Height Gages ¹	Up to 40 in	(300 + 1.6L) μin	Gage Blocks
Indicator Calibrator ¹	Up to 1 in	24 μin	Gage Blocks
Depth Gages ¹	Up to 24 in	(150 + 7.4L) μin	Gage Blocks
Length Standards ¹	Up to 28 in	(78 to 4L) μin	Gage Blocks and Analog Comparator
Cylindrical Plugs	Up to 10 in	(6.1 + 12L) μin	Gage Blocks with ID/OD Comparator
Cylindrical Rings	(0.125 to 11) in	(0.4 + 13L) μin	
Dial Indicators ¹	Up to 2 in	140 μin	Indicator Calibrator
Angle ¹	(0 to 90) °	0.005 °	10 in Sine Bar MET-SB-001



Length – Dimensional metrology

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Roughness ¹	118 µin	5.2 µin	Roughness Standard

Mass

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Pressure - Hydraulic ¹	(2 to 10 000) psig	(0.044 + 0.000 3 <i>P</i>) psi	Deadweight Tester
Pressure - Pneumatic ¹	(-14.7 to 3) psig (3 to 500) psig	0.006 1 psi (0.002 6 + 0.000 06 <i>P</i>) psi	Deadweight Tester Pressure Module
Torque - Measure ¹	Up to 25 in lb (25 to 250) in lb (25 to 250) ft lb (250 to 600) ft lb	0.59 % of reading 0.59 % of reading 0.62 % of reading 1.6 % of reading	Torque Calibrator MET-TW-002
Torque - Source ¹	Up to 25 lbf in (25 to 250) lbf in (25 to 250) lbf ft (250 to 600) lbf ft	0.08 % of reading 0.065 % of reading 0.066 % of reading 0.14 % of reading	6 in Torque Wheel and Class F Weights
Force ¹	Up to 1 000 lb (1001 to 25 000) lbf	0.29 lbf 18 lbf	Standard Weights, Load Cells
Gas Flow ¹	Up to 250 ccm (0.25 to 6) lpm (6 to 30) lpm (30 to 1 000) lpm	4.7 ccm 0.1 lpm 0.73 lpm 14 lpm	Bubble Generator, Laminar Flow Element MET-AF-001
Hydraulic Flow ¹	(0.2 to 5) gpm	0.87 % of reading	Stopwatch/Prover MET-LF-001
Flow Totalizer ¹	66 gal	0.021 gal	Volumetric Field Standard MET-LF-001
Scales ¹	(0.1 to 10) lb (10 to 60) lb (60 to 250) lb	0.002 lb 0.006 lb 0.03 lb	Class F Weights
Analytical Balance ¹	Up to 100 g 100 g to 1 kg	1.3 mg 28 mg	Class 1 Weights

Mass

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Durometer Hardness Testers ¹ Force only Types A, B, E, and O Types C, D, and DO	(10 to 100) duro	1.1 duro	Durometer Calibrator

Thermodynamic

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Temperature - Measure ¹	(-50 to 650) °C (650 to 1 350) °C	0.04 °C 2.6 °C	RTD 1502, TC 5520A
Relative Humidity ¹	(0 to 100) % RH	1.2 %RH	Psychrometer

Time and Frequency

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Stopwatch ¹	Up to 30 hours	0.009 % of reading	5245A MET-SW-002
Frequency	10 MHz	1.2 x 10 ⁻¹² Hz	GPS Receiver

Calibration and Measurement Capability (CMC) is expressed in terms of the measurement parameter, measurement range, expanded uncertainty of measurement and reference standard, method, and/or equipment. The expanded uncertainty of measurement is expressed as the standard uncertainty of the measurement multiplied by a coverage factor of 2 ($k=2$), corresponding to a confidence level of approximately 95%.

Notes:

1. On-site calibration service is available for this parameter, since on-site conditions are typically more variable than those in the laboratory, larger measurement uncertainties are expected on-site than what is reported on the accredited scope.
2. L = length in inches, P = pressure in psi, R = resolution of unit under test
3. This scope is formatted as part of a single document including Certificate of Accreditation No. AC-1358.



Vice President